

THE SCHOOL REVIEW

A JOURNAL OF SECONDARY EDUCATION

VOLUME XII
NUMBER 3

MARCH, 1904

WHOLE
NUMBER 113

THE HIGH-SCHOOL PROGRAM OF STUDIES AND THE STUDENT'S CURRICULUM.

II.

PART II.

In the first part of our discussion, after quoting definitions of "program of studies," "curriculum," and "course of study," and taking a view of the whole field of secondary studies, we proceeded to mention the general considerations, pedagogical, physiological, sociological, and æsthetic, that influence the expert in his organization of a high-school program of studies. We now proceed to particular considerations, using California conditions by way of illustration.

PARTICULAR CONSIDERATIONS.

1. *State law.*—In making his selection for the school program, the organizer thereof in California needs to bear in mind the state law, which declares:

Said course of study shall embrace a period of not less than three years, and it shall be such as will prepare graduates therein for admission into the State University. The high-school board may prescribe an additional course or additional courses of study, subject to the approval as hereinbefore provided [*i. e.*, the approval of the County Board of Education].¹

2. *University requirements.*—Since the state law requires that the students graduated from high schools in California shall be eligible for admission to some department of the State Univer-

¹ *Political Code*, Art. XII, sec. 1670.

sity, the organizer must needs be to some extent guided in his choice of subjects for his school program by the university requirements. These differ for the different colleges, and he would be keeping both the letter and the spirit of the law if he were to prepare his students in the minimum requirements. But he will undoubtedly desire to do more than this. He will endeavor, as far as possible, to include such subjects in the program as will make it possible for any student graduated from his school to enter the particular college he may prefer.

The accompanying chart shows at once what the requirements for the different colleges are.

This chart of university requirements suggests a few remarks. One cannot fail to observe the six units of constants in the requirements for *all* the colleges, and to note that they are in English language and literature, mathematics (algebra and geometry), American history and civil government, and physics. That is to say, we find the basal idea of the scheme of admission requirements to the University of California is that *every* candidate for college shall have a foundation in each of the four groups which may be considered fundamental, namely: language (English), mathematics, history, and a science, either observational or experimental. And for the remaining requirements in the different colleges the organizer of the high-school program as well as the student will do well to regard them as valuable guides, offered to the student by experts in those departments of professional work which the student hopes himself some day to enter.

Stanford University in its requirements permits somewhat more choice on the part of the high-school student than does the University of California, and makes it possible for a student to commence work in *any* of its departments even without his having definitely planned for that particular department at the beginning of his high-school course.

There is some advantage in this. As Professor Brown remarks, "secondary education shall help the student to find himself;" and if this is true, it is fair to assume that all have not "found themselves" when they enter upon their course in the

UNIVERSITY OF CALIFORNIA—ENTRANCE REQUIREMENTS FOR THE DIFFERENT COLLEGES.

(1) Age, sixteen years; (2) satisfactory references as to moral character; (3) the completion of one of the following groups of studies.

LETTERS: I _a		I _b	I _c	I _d	III	IV _a	
SOCIAL SCIENCES, COMMERCE, NATURAL SCIENCES		SOCIAL SCIENCES	NATURAL SCIENCES	COMMERCE	AGRICULTURE	MECHANICS, MINING, CHEMISTRY, CIVIL ENGINEERING	
Units	Units	Units	Units	Units	Units	Units	Constants
English	2	2	2	2	2	2	2
Mathematics	2	2	2	2	2	2	2
Physics	1	1	1	1	1	1	1
American History and Civil Government. I	1	1	1	1	1	1	1
Latin	$\begin{Bmatrix} 2 \\ 2 \end{Bmatrix}$	2	2	2	Elective	Elective	Latin
Greek	2		French or German } 3 or 4	French (elem) or German (elem.).... 2	Latin, or Greek, or English (adv.)..... 2 or French or German (elem.)..... 2	Latin, or Greek, or English (adv.)..... 2 or French (elem.), or German (elem.)..... 2	Other Languages
				Mathematics (adv.)..... 1	Extra half unit in Algebra, or..... $\frac{1}{2}$ Mathematics (adv.)	Extra half-unit in Algebra. Solid Geometry..... $\frac{1}{2}$ Plane Trigonometry..... $\frac{1}{2}$	Mathematics (adv.)
				Botany, or Zoölogy, or Chemistry } 1	Botany, or Zoölogy, or Physical Geography } 1		Natural Sciences
					Chemistry 1	Chemistry 1	Chemistry
						Drawing — Freehand 1 Geometrical	Drawing
Elective	3	Elective	Elective	Elective..... 3			Elective
Total.....	15	15	15	15	10 $\frac{1}{2}$	14 $\frac{1}{2}$	Total

secondary school. However, for any college in the University of California, save that of Letters, an intelligent student graduated from an accredited high school, can readily prepare himself with a little extra work in certain studies.

The following, which is p. 34 of the *Register* issued April, 1903, makes clear what Stanford's requirements are:

ADMISSION TO UNDERGRADUATE STANDING.

Candidates must be at least *sixteen* years of age. They must present certificates of good moral character, and, if from other colleges or universities, must bring letters of honorable dismissal.

Preparation for full undergraduate standing implies the completion of a four-year high-school course, or its equivalent.

Fifteen credits are required for admission in full undergraduate standing, each credit representing one full year's work in the high school, with daily recitation, two laboratory periods being regarded as the equivalent of one recitation period. These may be made up of English Composition (two credits) and such other subjects (aggregating thirteen credits) as may be selected by the candidate from the list given below, except that Subject 23 may not be offered with either Subject 10 or Subject 11. *Twelve* credits will be accepted for admission in partial standing.

Entrance credits may be obtained (a) on examination at the University, or (b) wholly or in part without examination. The subjects which may be offered, with the credit value of each, are enumerated below:

ENTRANCE SUBJECTS.

- | | |
|---|--|
| 1. English Composition (2) | 15. English History (1) |
| 2. Elementary Algebra ($1\frac{1}{2}$) | 16. American History (1) |
| 3. Plane Geometry (1) | 17. English Literature (1, 2) |
| 4. Solid Geometry ($\frac{1}{2}$) | 18. Spanish (2) |
| 5. Trigonometry ($\frac{1}{2}$) | 19. French (2, 3) |
| 6. Advanced Algebra ($\frac{1}{2}$, 1, $1\frac{1}{2}$) | 20. German (2, 3, 4) |
| 7. Physics (1) | 21. Latin (2, 3, 4) |
| 8. Chemistry (1) | 22. Greek (2, 3) |
| 9. Physiology (1) | 23. Biology (1) |
| 10. Botany (1) | 24. Physiography (1) |
| 11. Zoölogy (1) | 25. Mechanical Drawing ($\frac{1}{2}$) |
| 12. Freehand Drawing (1) | 26. Woodworking ($\frac{1}{2}$) |
| 13. Ancient History (1) | 27. Forge Work ($\frac{1}{2}$) |
| 14. Mediæval and Modern History (1) | 28. Foundry Work ($\frac{1}{2}$) |
| | 29. Machine Shop Work (1) |

3. *Majority preferences, or local environment.*—In every way possible the school should be brought into close touch with its

patrons. The organizer of the school program, therefore, in making selection among similar subjects, so far as educational value is considered, should be guided by the majority preferences of the students. Thus, if in a certain town a majority of the students prefer to study French rather than German, they should, if possible, be accommodated, and *vice versa*; and if, owing to the local environment, certain vocational studies such as book-keeping and stenography should be in demand, the organizer should, so far as possible, give these subjects a place in the program of studies.

4. *The number and special fitnesses of the teachers employed.*—In these days of extensive and intensive study in every branch of knowledge, few high-school teachers can be expected to have more than two specialties. Hence, where there are but three teachers, the organizer of the program will probably find himself somewhat restricted for want of a specialist in every branch he might otherwise select.

5. *The number of daily recitations advisable.*—If each teacher conducts six recitations daily, and he should not be expected to conduct more, especially in the hot districts, and if there be but three teachers for the school, the total number of recitations in different subjects and divisions of subjects cannot exceed eighteen. The principal should have at least one school period for supervising his assistants and for office work, so that the number should not exceed seventeen. But by alternating subjects in different years some expansion can be gained, although this is not entirely satisfactory. Thus, in Latin, instead of having separate classes for third- and fourth-year students, classes in Cicero and Virgil may be organized alternate years, and the third- and fourth-year students study these authors together. The number of students in these advanced classes is small in small schools, so that the different standards of excellence to be required of the third- and fourth-year students need not be overlooked.

Resulting program.—The organizer of a high-school program of studies has then many considerations to bear in mind. He would probably find it useful also to study the list of subjects

taught in some high school where perfect freedom of election, save in English, was allowed, and to take note of the numbers of students electing the several studies. Such records might at least be allowed some weight in apportioning school time among the subjects decided upon.¹

Program of a three-teacher school.—Thus guided, the organizer of a three-teacher school in the state of California would probably find his program of studies comprising the following:²

M ¹	H ¹	L ¹	E ¹	S ¹	G ¹ or Fr ¹ or Sp ¹
M ²	[H ²]	L ²	E ²	S ²	[G ² or Fr ² or Sp ²]
M ³	[H ³]	[L ³]	[E ³]	S ³	[G ³ or Fr ³ or Sp ³]
	H ⁴	[L ⁴]	[E ⁴]		

The brackets denote that those classes would be combined and the different divisions of the subjects taught in alternate years, as explained above. As good reasons might be given for the teaching of English history before mediæval and modern as for the opposite order named in the report of the Committee of Seven to the Committee on College Entrance Requirements. That there is no particular reason why the study of Cicero should precede that of Virgil, or *vice versa*, is evident from the follow-

¹See SCHOOL REVIEW, Vol. IX (June, 1901), pp. 405, 406, for the record of the Medford High School, Massachusetts, where for the school year 1900-1901 complete freedom of election was allowed in all subjects save English.

²The following abbreviations are here employed :

M¹ = first-year mathematics — algebra.

M² = second-year mathematics — geometry.

M³ = advanced mathematics — trigonometry, solid geometry, and higher algebra.

H¹ = first-year history — ancient history to 800 A. D.

H² = second-year history — mediæval and modern history.

H³ = third-year history — English history.

H⁴ = fourth-year history — American history and civil government.

L¹ = first-year Latin.

L² = second-year Latin.

L³ = third-year Latin — Cicero or Virgil.

L⁴ = fourth-year Latin — Virgil or Cicero.

E¹, E², E³, E⁴ = first, second, third, and fourth years of English respectively.

S¹ = first-year science — physiography.

S² = second-year science — physics.

S³ = third-year science — chemistry.

G¹, G², G³ = first, second, and third years of German respectively.

Fr¹, Fr², Fr³ = first, second, and third years of French respectively.

Sp¹, Sp², Sp³ = first, second, and third years of Spanish respectively.

ing statement taken from the report of the Conference on Latin to the Committee of Ten: "The conference makes no recommendations upon the questions whether Cicero should precede Virgil, or Virgil Cicero; but suggests that if Cicero precede, four orations be read, then six books of Virgil, followed by the remaining two orations." The topics in E³ and E⁴, being for the most part specimens of literature, can be more or less equalized as regards difficulty and the two classes combined; and the same could be done in the second and third years of the modern-language study. The chief objection to this combination of classes lies in the fact that there would be in every such class two grades of pupils—a disadvantage that would be most felt in the second and third year's modern-language work; but to this it may be said that, the classes being small, the individual difference could be recognized and work correspondingly adjusted. At any rate, better work will be done and better discipline effected if the hours of school be not too long continued and the teachers be not overworked, than if, as in so many places, both these sins be committed.

Daily schedule of a three-teacher school to comprise seventeen recitations.—If one distinct class were organized for each yearly division of all subjects usually included among secondary studies, the total number of such classes would be at the very lowest calculation forty-five. But by the process of selection, working along the lines indicated above to accommodate the greatest number of needs of the greatest number of pupils, this number has been reduced for the three-teacher school to twenty-one in all, or through the combination of certain advanced classes, where the number enrolled is comparatively small, to seventeen.

Expansion of program with growth of school.—High schools in California have been growing rapidly of recent years. The Rowell Act of March, 1903, granting state aid to high schools, will probably increase this growth. Let us hope it will not cause the repetition of the mistake made in the elementary school system of establishing little schools for every few families, but will rather build up strong high schools well manned and well

managed. As the enrolment of students increases, the number of teachers can be increased, and the program thereby enriched and greater election of studies made possible.

Thus, as soon as a *fourth teacher* can be added, the organizer of the school program will be able to double the recitation period in S² (physics) and S³ (chemistry). He may also make distinct classes in the second- and third-year modern-language work, and in the third- and fourth-year English work. If the locality desires it, he may devote the remaining two periods to vocational studies, probably bookkeeping and stenography. If this is not necessary, he might use these two periods for work that would to some extent take account of the sociological and æsthetic considerations discussed in the earlier part of this thesis.

When a *fifth teacher* is added, distinct classes can be formed for third- and fourth-term Latin, and for second- and third-year history. Drawing, both freehand and mechanical, should now be introduced. It will probably be found necessary at this stage of the school's growth to organize two classes in M² and two classes in E¹.

When a *sixth teacher* is added, an additional foreign language, taking three recitation periods, could be introduced; also a double period for an additional science—biology, if the necessary equipment can be obtained. The remaining period will probably be needed for an additional class in American history and civil government.

From this point on the needs of the school will be a manifest guide as to the direction the expansion of the program should take. Local environment will be increasingly influential. The American public school is a democratic institution, largely governed and controlled by a local board of education. Provided the pedagogical requirements are not interfered with, it is well for the community through its board of education to take an active interest in its high school. In doing so, the community will naturally be interested in the choice of subjects taught in its school, and will occasionally make demands with regard to the program of studies. And this is all as it should be.

The three-teacher school time schedule or daily program.—Having settled upon the subjects to be taught in the seventeen daily

recitations of our three-teacher school, we have now to frame such a time schedule as will enable the students of each year to get all the studies they desire; in short, we must avoid as many "conflicts" as possible.

The twenty-one divisions of subjects on p. 202, comprising the complete program of studies in the three-teacher school, may be readily classified according to the years in which they will usually be studied. At least the sequence of studies may be indicated. Thus:

E¹ M¹ L¹ H¹ S¹ - - - - - first-year studies
 E² M² L² H² (G¹ or Fr¹ or Sp¹) - - - - - second-year studies
 E³ L³ H³ S³ (G² or Fr² or Sp²) - - - - - third-year studies
 E⁴ M³ L⁴ H⁴ S⁴ (G³ or Fr³ or Sp³) - - - - - fourth-year studies

Now, while no student will be likely to take all the subjects assigned for one year, yet, in order to permit of the formation of the greatest possible number of curriculums—that is, in order to allow of the widest possible "election" on the part of the student—the time schedule must be so arranged that no two subjects represented on the same horizontal line of the above diagram shall be taught during the same recitation period.

The specialties of each teacher in the school must also be noted and care taken that no two subjects taught by the same teacher shall fall in the same period.

The following plan may prove suggestive. Supposing the following combination of specialties to occur, namely mathematics and English, Latin and history, science and German,¹ a schedule may be planned thus:

PERIOD	TEACHER A		TEACHER B		TEACHER C	
	Mathematics	English	Latin	History	Science	German
I.....	M ³	.....	.....	H ¹	S ²	.....
II.....	.....	E ²	.....	H ⁴	S ¹	.....
III.....	.....	E ³ E ⁴	L ²	.....	.....	G ¹
IV.....	M ²	.....	.....	H ³ H ³	S ³	.....
V.....	M ¹	.....	L ³ L ⁴	.....	Free period for principal's office work	
VI.....	.....	E ¹	L ¹	.....	
						G ² G ³

Proportional time allotments: Mathematics, $\frac{1}{7}$; English, $\frac{1}{7}$; Latin, $\frac{1}{7}$; science, $\frac{1}{7}$; History, $\frac{1}{7}$; modern language, $\frac{1}{7}$.

¹ "German" here represents the foreign modern language, whichever is taught.

The following is a schedule for a different combination of specialties, namely, mathematics and science, English and Latin, history and German:¹

PERIOD	TEACHER A		TEACHER B		TEACHER C	
	Mathematics	Science	English	Latin	History	German
I.....	M ¹			L ³ L ⁴		G ¹
II.....		S ¹	E ²			G ² G ³
III.....	M ²		E ¹		H ⁴	
IV.....	M ³			L ¹	H ² H ³	
V.....		S ³		L ²	H ¹	
VI.....		S ²	E ³ E ⁴		Free period	

Proportional time allotments: Same as above.

Students' curriculums in accordance with the time schedule.—Taking the first schedule of the two just given, let us proceed to frame a student's "curriculum" in accordance with it. The following table shows the subjects for the respective four years of the student's high-school life, arranged in the order of the time schedule:

K.

Period	Year 1—Subject	Year 2—Subject	Year 3—Subject	Year 4—Subject
I.....	H ¹	S ²	Study period †	M ³ †
II.....	S ¹	E ²	Study period †	H ⁴ †
III.....	L ¹	G ¹	E ³ or E ⁴	E ⁴ or E ³
IV.....	Study period *	M ²	H ² or H ³	S ³
V.....	M ¹	Study period *	L ³ or L ⁴	L ⁴ or L ³
VI.....	E ¹	L ²	G ² or G ³	G ³ or G ²

† The schedule is purposely arranged to make it possible for students to take M³ or, perhaps and, H⁴ in their third year if it is thought desirable. It also makes it possible for a student to take a second time H¹, S¹, S², or E², if he should have failed in one of them the first time. Or these two periods may be used for the study of any of these four subjects for the first time, if they have not been already taken. In short, these two periods give considerable flexibility to the student's curriculum.

* These study periods are purposely placed here; for, according to my time-table, one will come just before, the other just after, the noon intermission. For the significance of this see (4) under "Remarks" on the time-table, p. 208.

If the subjects here be properly treated, the student should be able to gain profitable training in a high school with such a

¹ "German" here represents the foreign modern language, whichever is taught.

schedule. He is here brought into touch with life at several points. Avenues are opened into the realms of nature and of man, and opportunities are afforded adolescents to "find themselves." For the few who go on to college, and for the many who do not, this program, restricted as it is, will undoubtedly meet many needs of many students.

The student preparing for entrance to the University of California College of Letters will find here all the subjects "required" save Greek.¹ Students preparing for any of the other colleges—be they those of Social Sciences, Natural Sciences and Commerce, or of Agriculture, Mechanics, Mining, Chemistry, and Civil Engineering—will find here a sufficiently wide range of subjects to enable them to meet the requirements, save that for the last four colleges mentioned, drawing, freehand and mechanical, will be required after 1904-5.

Students who complete a full four-year course will, if recommended, have no difficulty in entering Stanford University, which makes no special restrictions as to subjects, save that two of the fifteen entrance credits must be for English composition. It stands to reason, however, that students should equip themselves for their college work by including among their studies in the high school those which will best serve them for the special line of work they intend to pursue.

Time-table for a three-teacher high school.—To complete the organization with reference to the program of studies, a time-table is here submitted with a few remarks. Circumstances, however, so differ in different schools that it is hardly likely that many would use the same time-table. This, however, may prove suggestive and for this reason alone it is inserted here:

MORNING.				AFTERNOON.			
9-9:15	-	-	Study period for all	1:10	-	-	Reassemble
9:15-10	-	-	Period I	1:15-2	-	-	Period V
10-10:45	-	-	Period II	2-2:45	-	-	Period VI
10:45-11	-	-	Recess	2:50	-	-	Dismiss
11-11:45	-	-	Period III				
11:45-12:30	-	-	Period IV				

¹ In some schools a special class is held after ordinary school hours for students desiring Greek for entrance to the College of Letters, and one of the teachers takes charge of it, chiefly as a labor of love and cultural service.

REMARKS.

1. This time-table is arranged with a view to California conditions. In many counties, for many months of the year, the high temperature renders mental work between 3 and 4 o'clock in the afternoon almost impossible. As frequently remarked, teachers and pupils "just wilt" at that time. Hence four recitation periods are arranged for in the morning, and only two in the afternoon.

2. The morning is commenced with a fifteen-minute study period. This serves many purposes.

a) It begets a studious attitude on the part of the student. Almost all students will study intensely with the day's lessons ahead of them.

b) It gives teachers time to attend to the necessary records of attendance, to take account of tardy students without interrupting a whole class, to put such outlines and directions on the black-board as the day may require, to make such general announcements as may be necessary, and to talk to the students occasionally on matters of conduct, general information, and patriotism. Experienced teachers know these things must be attended to. To provide no time for them is to "crowd" the teacher and keep her in a state of continual annoyance by reason of these details of her work.

c) It gives the busy principal an opportunity to attend to matters that often do not reveal themselves until school is called.

3. A recess of fifteen minutes is planned for in the middle of the morning. This is absolutely necessary for hygienic reasons. It is monstrous to attempt to drive young people, or any people for that matter, through a whole morning's mental labor without any relaxation, physical or mental. The sound body is imperatively necessary, and American schools of the twentieth century should take as much pains to secure it as did the sturdy Greeks of three centuries before Christ.

4. The noon period for many students, who desire to go home to lunch, may be lengthened by excusing them during the fourth or fifth period of the day, if they have no recitations at one of those times. Thus, by reference to Schedule K on p. 206, it may

be seen that all first-year students might be excused at the end of the third period, that is, at a quarter to twelve, while second-year-students having no recitation during the fifth period need not return until 2 P. M.; of the third- and fourth-year students all but those studying Latin might be excused the fifth period, that is to say, be allowed a noon intermission extending from 12:30 to 2 o'clock; and of the Latin students there would be several who could be excused the fourth period, unless they were taking H², H³, or S³. In this way nearly all the students could be accommodated with a long intermission at noon, if it were desired, while the work of the whole school would be over by 3 P. M. There need be little trouble in managing this matter, if it is explicitly understood that the extended intermission is for those only whose parents desire them to go home for lunch (the desire to be expressed in a written request at the beginning of the term), and that any student who abuses the privilege, or whose conduct in school is not satisfactory, renders himself liable to the immediate forfeiture of this privilege of extended intermission. This arrangement prevails in the Portland (Oregon) High School.

5. Evening study made possible. Nothing is more valuable to a young man than the formation of proper habits in the spending of his evenings. The law in California forbids the assignment of home work while a child is passing through the grammar grades; and this, while doubtless on the whole beneficial to the health of the child, leads frequently to excessive desultory reading and aimless, drifting habits of evenings. When the youth goes to college, his success will largely depend upon his ability to apply himself steadily to the preparation of his assigned work, and this must usually be done in the evening. If, instead of going to college, he enters commercial life, his promotion depends largely on the way he makes use of his evenings. When married, much of his domestic happiness depends on his ability to enjoy quiet evenings at home. If, then, during the adolescent period the youth becomes accustomed to quiet study at home in the evening, he will have formed a habit that will, throughout life, bring him much positive good, and will also save him from innumerable temptations. But how is this pos-

sible for a growing, energetic lad, if he be kept confined in school from 9 to 12 in the morning and from 1 to 4 in the afternoon? By closing school at 3 o'clock, however, opportunity is afforded the boys for a really good time before supper—a time when they can work off their superabundant energy and secure proper physical development and wholesome mental relaxation. It will then be fairly easy for them to settle down to evening study; and this habit, once formed, will be a source of health, strength, and pure enjoyment all through life.

THE STUDENT'S CURRICULUM.

Organization on anything approaching a large scale must necessarily be based on generalization. The general, the "captain of industry," in short the organizer in any line of work, must merge the individual in the mass, must subordinate special and particular needs to general requirements. Only so will he avoid partiality; only so will he secure proportion; only so will he meet the greatest number of needs of the greatest number of individuals. But while having all the difficulties of the ordinary organizer, the organizer of the high school has others, arising out of the nature of those for whom he is organizing. He can make no more fatal mistake than to overlook the fact that the adolescent, the student as we have him in our high schools, is so constituted that he will do good work, enduring work, work worth the doing, only when he is working in accordance with what he feels to be to his own interest and advancement. If he once comes to think that he is a mere cog in a school machine, that he is being ground through a certain scholastic mill, and that the preservation and polishing of the machinery are more thought of than the valuable physical and mental "stuff," however costly, that is being wrought upon, he is likely to cause trouble. Either he will depart and leave the machinery to be employed upon poorer stuff, stuff more ductile, but of little inherent strength, or he will assert himself, demand some rights of initiative—and then there will be friction.

And this brings us to the apparent dilemma mentioned in the early pages of this discussion. Recognizing, on the one side, the

necessity of organization and the superior ability of the expert to prescribe a curriculum best suited to the individual student's needs, we are confronted, on the other side, with the necessity of obtaining, not merely the student's passive assent to the course prescribed, but his active and earnest adoption of that course or of one very similar to it. Let us consider this problem, and see whether these conflicting elements cannot be harmonized.

In the first part of this discussion we have seen how the organizer, keeping in mind the contending forces acting in the selection of subjects for the program of studies, strove to arrange such a program as would meet the greatest possible number of needs of the greatest number of students taking work in his school. The limitations were many, but he did his best; of the inadequacy of the resulting program to meet *all* the needs of *all* the students, no one knows better than he. All that can be reasonably expected in any case is that the result be the best possible under the circumstances. The program, then, has been as broad as is consistent with thorough efficiency and enduring quality. It is true that we might have lengthened the day, added more recitation periods, and extended the program. But to do so we should have been compelled to overwork the teachers, which would have resulted in taking the joy from their work, and, with the joy, nine-tenths of the effectiveness.

Referring now to the definition of terms at the beginning of our discussion, we note in the quotation from the report of the Committee on College Entrance Requirements the statement that the "program may be made to yield several curriculums, or possibly almost as many curriculums as there are students, each curriculum perhaps being better than the others from an individual point of view" This indicates at once that the formation of a "program of studies" does not carry with it a hard and fast "curriculum" for every student. It is true that in a small school the curriculum cannot vary very greatly, if the student is to take a full four-year course, but still it can vary to some extent, and this extent grows rapidly greater as the size of the school increases. And it is in this variation that the student's individ-

uality can be taken account of.¹ This brings us to the question of the student's election of studies.

THE STUDENT'S ELECTION OF STUDIES.

Shall the expert educator, after studying the individuality of the student, diagnose his case, and not only prescribe for him but compel him to follow a certain curriculum; or shall the student, supposedly knowing his own aptitudes, be allowed under guidance to form his own curriculum? On the one hand, we must admit that the experienced educator is likely to choose better than the inexperienced, unaided student; on the other hand, the student, by virtue of the characteristics of his adolescent condition, is likely to accomplish more when working according to a plan he believes to be his own than when slavishly following a prescribed course. The movement in education throughout the United States is undoubtedly in favor of election by the student, and it has become the problem of the educator to see whether conditions cannot be so arranged that the student will freely choose the course which the expert educator would choose for him.

In the first place, to clear matters somewhat, a word may be said to those who profess to believe that freedom of election will lead all students to "hunt for snaps;" that is to say, to look for such courses of study as will enable them to secure a diploma with but little effort. It seems to me there are two obvious answers to this objection. First, there should be no "snaps" for students to find, and if the system of election will reveal to the principal of the school, and the others in authority, the work in the school that is lacking in thoroughness and educational value, it will be a service to the school and lead to greater general efficiency. It might also draw attention to certain classes where the teachers were making the work unnecessarily laborious. But in a school properly supervised by a capable principal there will be no "snap courses" for lazy students

¹We see here the reason for discouraging the building of many small schools. I do not mean to say that there are not some good reasons for small schools near the homes of the students. Everything in life must be judged by the weighing of relative values; every good is a mean between two or more extremes.

to elect. Secondly, such students who are inclined to seek for "snaps" need to be reasoned with as to the advisability of study at all, and not as to the preference of one study over another. There may be many reasons for their dislike of study. Perhaps they want to be "doing" things, and the school demands that they sit still hour after hour and read about things. Possibly, by reason of some physiological defect of eye or of ear, the ordinary school work becomes speedily irksome. Most likely their interest has been killed by some weak teacher, and like most young people they have generalized on insufficient data, and come to the conclusion that all teachers are bores. But, whatever the reason, the case of these students should not be quoted as an argument against the elective system; for, indeed, in a properly supervised school they are dealt with no less easily under an elective system than under a required system.

Let us now turn to the great majority of students—those who come to the high school, often withstanding the temptation to earn some much-desired pocket money, and who look to the school to fit them to do some useful work in life, to hold an honorable position in society, and to be a credit to themselves and their friends. How shall they be led to choose for the best? To answer this, we shall do well to find out what it is that gives them a preference—doubtless, in some cases, a mistaken preference—for some studies rather than others. Where, for example, does a certain boy get his notion that he wants to study Latin?¹ If we can find that out, we shall be getting at the root of the matter, and can then more easily see what we must do to get the results we desire.

The question, surely, is not very difficult to answer. The boy reflects his environment, that is all. He has been subject all his life to the suggestion of certain people. In school matters, these are usually his parents, his older brothers and sisters who have been to the high school before him, his former teachers and his other friends. Perhaps, too, in his reading in the library of

¹The elective system has been fairly generally adopted throughout the United States, at least so far as certain courses are concerned (*e. g.*, Latin, scientific, commercial English), and yet the proportion of high-school students taking Latin has doubled during the last ten years.

his town he has lit upon some book that has had a marvelous fascination for him, and has awakened in him an ardent desire to study some particular science. The reading, it may be, about the construction of the great Assouan dam across the Nile has kindled in him an ambition to be a great engineer, and his interest in this great end gives him abundant interest in the means—geometry and trigonometry. Perhaps his religious emotions have been stirred, and he desires to study Greek that he may read the New Testament in the original. Only in rare cases shall we find any attempts at radical departure from a normal course. As Professor DeGarmo says in his recent discussion of *Interest and Elective Studies*:

Nor need we fear that tradition will not have its due weight. It takes a courageous mind to forego classics for modern languages if such a course is thought to be an evidence of lack of ability or of diligence. There is more danger that a student will elect the old studies to his injury than that he will suffer harm from choosing the new—witness the fact that the proportion of high-school students taking Latin has doubled during the last ten years.

If, then, we wish the student to choose wisely, we must study the chief factors in his environment and exert our influence accordingly. To begin with, the teachers in the higher grades of the elementary schools should be thoroughly instructed in the relations and value of the different high-school studies. The students now in our high schools should be so instructed in the full program of studies as to be able to explain it to their younger brothers and sisters, and to anyone else asking information of them. At parents' meetings, now becoming more and more common, the matter should be brought up from time to time and carefully discussed. Further, the principal and teachers of the high school should be in close touch with the teachers and pupils of the grammar grades, and the high-school program should be explained to the prospective graduates of the grammar schools. If explained by one who thoroughly understands it, this program is not more difficult for a pupil to comprehend than many topics we teach him in history, civil government, physical geography, and mathematics. Finally, each term before the opening of school it would be helpful, it seems to me, if the principal of

the high school could keep office hours to see students individually who might desire to consult him as to their high-school course.

In this interview the principal would probably wish to draw attention to the considerations, general and particular, taken up at some length in the first part of this discussion; and perhaps to account for the exigencies of the program that limit the student's choice. He would also probably find it advisable to point out that some studies in the program required either certain other studies or a certain maturity of intellect only reached toward the end of the student's high-school career. He would almost certainly need to warn the student against attempting to take too many subjects at once. Finally, let us hope the principal would succeed in enlisting the student's sympathies on the side of order and harmony and in stirring up in him a lofty *esprit de corps*.

Considering the natural prestige of the high-school principal, and the impressionability of the adolescent if courteously treated, there will be very little difficulty in getting the student freely and willingly to choose the course considered best for him. Indeed, the difficulty lies rather in getting the student to exert any initiative at all. As Superintendent Seaver says in his Report to the Boston School Committee in 1901:

It will not be easy to lead young people out of their earlier habit of unthinking acceptance of all school work required of them into the later habit of rational inquiry as to the suitability of that work to their personal needs. But it is just this change of habit which ought to take place during the high-school period, and the system of elective studies is perhaps the best means for promoting this change. It is even to be feared lest this desirable change of habit be delayed by the very abundance and urgency of the advice given to the young choosers; for there is such a thing as giving young people too much advice—tempting them to rely too much upon it, and too little upon their own judgment and initiative, in choosing their courses of action.

HERBERT LEE.

SAN JOSÉ, CALIFORNIA.

ADVANTAGES OF A YEAR'S COURSE IN BIOLOGY (ZOOLOGY, PHYSIOLOGY, BOTANY).

THIS is an age of science. The contributions of applied science to the comfort and elegance of our daily lives have been so vast as almost to defy enumeration. This is a practical age. Hence, with the great advances in the direction of applied science, there has come a demand for a fuller study of pure science, not only because scientific principles must be known in order to be applied, but also for its own sake, as an essential element in a liberal education.

This latter demand was for a long time satisfied by what was known as a "culture course," the idea being that, by a series of lectures and assigned readings, an instructor could put his eager classical students in touch with the results of scientific research. It is a cause for regret that in some quarters this kind of "culture course" has not yet become extinct.

A long step in advance was taken when these culture courses were supplemented by practical work on the part of the student himself, the purpose being not so much to store his mind with interesting facts, as to lead him, by his own direct contact with the objects themselves—which are the real facts—to an appreciation of the methods of original scientific work, and the laborious processes by which the generalizations of the science have been reached. It was right here that the supreme opportunity was given to science to demonstrate its unique value as a part of our educational system. Up to this time the average student in science gained little of real value beyond the smattering of information by which he could make small-talk in society, or illustrate his sermons. His knowledge of facts was acquired along the path of least resistance, the memory, resulting in the partial atrophy of other important mental faculties. Now, eye and hand must be trained to do the bidding of the mind. The student must learn to be accurate as an observer, discriminating

between the essential and the nonessential, the typical and the abnormal, honest in making his record of observations, candid and logical in the conclusions drawn from those observations.

Of all the sciences which have lent themselves to this method of study in the high school, none is more important than biology, since it stands in such close relation to our own personal welfare. We are the youngest of them all, and yet it is inspiring to glance back over our history, looking at it, for the present, entirely from the educational point of view. It is interesting, also, to note the closely parallel lines along which our educational ideals have passed in the two co-ordinate branches of biology—zoölogy and botany.

Glancing first at zoölogy, we see how, even within the recollection of many of us, the best schools were contented with a method of study which trained only the memory. Systematic zoölogy, or classification, lent itself readily to this style of treatment, and was almost universally taught. Then when the insufficiency of illustrative material, as viewed from the teacher's desk, began to be felt, specimens were handed out to the students, first for mere external examination, and later for internal study (dissection); and since only a limited number of forms could be studied in this way, we see morphology fairly installed as the subject-matter, and type-study as the special laboratory method. At first this was used merely as an aid to the understanding of the broad outlines of classification, but as teachers found that students were more interested in a structure when they knew what it was for, more and more attention was paid to function, or physiology. Today most of our schools are teaching this kind of zoölogy, and opinion is somewhat evenly divided as to whether the chief attention should be paid to the study of the structure of a series of types, or to the life-habits of animals. What might be called the new zoölogy—the study of the adaptations of animals to their environment, or ecology—is a natural outgrowth of the increasing attention which has been paid to the study of function.

Turning now to botany, we need not spend much time in telling how long the "classification" of plants was regarded as

the highest goal for the ambition of the investigator, as well as the proper work for the beginner, and a refined and uplifting recreation for amateurs in every walk of life. Indeed, botany remained so long the "gentle science" that even today, in some quarters, it is hardly considered a worthy occupation for men. Further, systematic botany, as taught, was confined to the study of the flowering plants, and when its immediate successor and partial contemporary, structural botany, came into prominence, that also was limited in its application. Imagine a class in zoölogy beginning its work with the comparative anatomy of vertebrates! A more rational treatment of plant anatomy soon brought it into proper relations to classification and development, and we reached, at last, a true morphology. Greater attention was now paid to the flowerless plants. The "dirty scums" of the pools were found to consist of objects full of beauty and interest. The bark of the trees, the dirt in our flower-pots and greenhouses, the dripping rocks in our glens, all had their part to contribute to the new old subject. Then the inevitable happened in botany, just as it had in zoölogy. No teacher can arouse much interest in mere structure, if its function, the reason for its existence, is not understood. It was a professor of Latin in one of our largest universities who, hardly five years ago, asked a botanist what possible connection there could be between physiology and botany! There *is* a very real connection between them, and our Latin professor might do well to glance over the rapidly increasing number of excellent textbooks and laboratory guides in plant physiology.

Thus far, if the truth be told, botany was merely following in the footsteps of zoölogy. But we can now show where botany has at last taken the lead. Kerner's *Natural History of Plants* is an old book, but it is read more and more every year. The work of Haberlandt on the *Physiological Anatomy of Plants*, and later that of Warming on *Ecological Plant Geography*, have brought into prominence a phase of botany so natural that we seem almost to have known it always, so interesting that we might well be asked why we neglected it so long. The teaching of zoölogy had long been established on the basis of morphology and physi-

ology, when the work of the botanists stimulated their brethren to an increased attention to the questions of animal ecology. Thus, in the "Twentieth Century Series," Jordan's *Animal Life* follows Coulter's *Plant Relations*. Note also the increasing interest in the study of the habits of birds and insects.

In physiology, also, there has been an advance, especially when, as will be shown later, it has followed a course in zoölogy. In former times far too much time must needs be spent in the study of the anatomy of the body, and the writer can remember distinctly the hard work he had to make a poor memory keep such things as the bones of the body and the cranial nerves in proper order. Today, while we are still obliged to study the anatomy of the body, we are paying more attention to the functions of the various organs. This gives us a much better foundation for a rational instruction in hygiene—a condition which we all welcome, even though we may think that the alcoholic appendix is abnormally large!

Then many of us are finding an increasing satisfaction in teaching what is known as *cell-physiology*. Without going at all into details, this is a universal, a general physiology, its data being derived from the study of plant cells as well as those of animals, its conclusions being applicable alike to both. Treated thus, human physiology is but a special phase of a much more general subject. It may be said with safety that this is the highest form of physiology, since it makes it a part of the general science of biology, co-ordinate with general morphology.

In this hasty sketch no attempt has been made to point out the specific influences of one science upon the other, except in the most casual way. We may now consider some of the influences which each of them has exerted, or may exert, upon the others.

The study of zoölogy has, as we have seen, passed from systematic zoölogy to morphology and physiology. How does this affect human physiology? First of all, the study of a series of graded types gives the student a knowledge of comparative anatomy, so that when he comes to the physiology he need not spend so much time on the anatomy of the body, but

can pay more attention to physiology proper—a practical gain of very great importance. Then, too, it gives a chance, by the study of the lower, simpler forms, to see what are the fundamental physiological functions. Nutrition, respiration, irritability, all are seen in the protozoa, reduced to their lowest terms, separated from all complicated anatomical machinery. Nutrition is the nutrition of the cell; respiration is the respiration of the cell. In the higher animals there is simply a division of labor between different kinds of cells. Ask a class in physiology the fundamental purpose of respiration, and how often the answer will be, "to purify the blood." But if that class had been studying the respiration of a graded series of types from *amœba* up, it would see that what the physiologies call the "internal respiration" is the real respiration, the respiration of the cells, and that the question as to whether the gas exchange (external respiration) shall be effected through a moist skin (as in the earthworm), or gills (crayfish), or lungs (man), is simply one of adaptation to a particular environment, the blood being in all cases simply a medium of exchange between the outer world and cells which are in the interior of the body. This is but a single illustration of the importance of a comparative study of the physiology of the types used in zoölogy.

That zoölogy has by a good example in times past helped to bring about much-needed reforms in the teaching of botany cannot for a moment be doubted. We have already shown how much earlier zoölogists adopted methods of teaching which are of standard value today. Botanists have done well to follow their lead. It stands to reason, too, that a well-trained zoölogist, carrying over to his botany class the results of the careful methods of work used in zoölogy, will produce equally good results in botany. But it should be emphasized right here how much botany has suffered at the hands of those self-styled "biologists," who are in training and sympathies merely *zoölogists*, and whose only knowledge of botany comes from a day or two spent on *protococcus* and *spirogyra*, and a long-forgotten course in Gray's *Lessons*. We botanists ask for no better training in botany than in zoölogy, but we do want it to be equally as good.

In speaking of the influence of physiology upon zoölogy and botany, it is admitted by every live teacher that physiology is to a good course in either zoölogy or botany very much what the juice is to an orange. With it, there is plenty of life and interest. The trouble with our old-style botany courses was that, in our administration of the legacy handed down to us by Professor Gray, we made the mistake of leaving the physiology out. The result was that dried plants were considered nearly as valuable as living ones, and often even more valuable, and we became mere dealers in baled hay!

Then, too, the higher physiology, the physiology of the cell, will act as a valuable check on the teacher, who must be careful to employ terms in describing the physiology of the plant in the same sense in which they were employed with animals. For example, if he has taught the proper meaning of digestion and assimilation in zoölogy, he will be obliged to stick to his definitions when he comes to botany. After a good course in animal morphology and physiology, a teacher (or a text-book) ought to expect trouble with a bright class if they are told that water and mineral matter and carbon dioxid are "digested" in the leaf. And the trouble ought to be heated seven times hot for those who persist in retaining in any form the word "assimilation" in connection with the process of food-manufacture in the green plant. The one defect in what is in other respects an admirable elementary text-book is the retention of that misleading word, even going so far as to call it in one place "assimilation proper," with no apology for it beyond the mere use of quotation marks. Again, if respiration has been correctly defined in zoölogy, it will be easier to draw the distinction between that process and photosynthesis in green plants; and each process can be better understood if the cell is looked upon as the unit of action.

In what way has botany helped the other biological sciences? Certainly, by calling attention to the advantages of a study of the habits of living things and their special adaptations to their natural environment, zoölogy has been made more of an outdoor study than it had been for some time past. This certainly is a

step in the right direction, since it takes the student out into nature's great laboratory, and at the same time teaches him to respect the lower forms of life by showing him that each animal, likewise each plant, has its own life-problems to solve. By studying the animal or plant from the standpoint of its own personal well-being, the student is led to feel a greater respect for their life, and is thus made less selfish in his attitude toward the world in which he lives.

Then, too, the painstaking accuracy of the earlier botanists has not been without its effects upon those working in the other science. The first conception of the cell theory itself came as the result of the study of plant tissues.

We have already pointed out some of the mutual relations between botany and physiology. We may simply add here that we know far more regarding the chemistry of animal digestion as the result of the work of the plant physiologists.

It may be thought that most of the considerations presented are more theoretical than practical, but surely they are not without a practical bearing. In studying the practical benefits to be derived from a combined course in zoölogy, physiology, and botany, we can see that some of them will be direct, others indirect. The direct advantages of the combined course in any one year will depend, naturally, upon the actual order in which the subjects are taken up. If zoölogy precedes physiology, the study of the comparative anatomy and physiology of the lower forms will aid materially when applied to human anatomy and physiology. Thus opportunity will be given for a more careful study of many topics which must otherwise be slighted, for mere lack of time. The way in which botany will be benefited by the previous study of zoölogy and physiology has already been pointed out.

But the advantages of such a combined course are not at all confined to any one year. Such a course cannot be given year after year without exerting a most profound influence upon the teacher. If the three subjects are taught as parts of a larger, broader science, the teacher, at least, will see more and more

clearly the many points of contact between them. And as his own horizon expands, he will impart to his pupils a much broader conception of life in all its varied forms and manifestations; and this is the supreme object which we hold before ourselves in all our educational work.

WILLIAM DAYTON MERRELL.

UNIVERSITY OF ROCHESTER.

MEMORY WORK IN LITERATURE.*

It is my purpose this morning to enter a plea for the reintroduction of a method of English training that has of late years fallen into neglect and even into discredit. In my boyhood days, as doubtless in yours, it was the custom in preparatory schools to have the pupils commit to memory selections of prose and verse, and recite them on Friday afternoons. As well as I remember, this practice was begun in the primary grades; I know that it was continued through the grammar-school and high-school grades. As a training in public speaking, I am not sure that this discipline accomplished a great deal; but in broadening insensibly the vocabulary, in revealing hidden harmonies of thought and expression, in developing a feeling for rhythm in poetry and for sentence structure in prose, in enriching the mind with a storehouse of suggestive material that will unfold into new beauty and deeper meaning with advancing years, and above all in fostering a habit that will at last transform a duty of boyhood into a pleasure of manhood, it is my conviction that no other discipline can ever take the place of this systematic memorizing of good literature.

Even memory itself seems today to be a discredited faculty. Memory has, I concede, a troublesome way of slipping out of its own sphere and simulating the functions of reason and judgment. In arithmetic, for example, the teacher cannot be too careful that *memoriter* repetitions shall not usurp the place of independent reasoning. In English grammar the ability to reel off rules and definitions does not imply the ability to speak or to write with even passable correctness. These, however, are the misapplications of memory. No faculty should be judged by its abuse. "Savoir par cœur n'est pas savoir," says Montaigne; but the schools of Montaigne's day stuffed the

*Read at the annual meeting of the Association of Colleges and Preparatory Schools of the Southern States, Trinity College, Durham, N. C.

heads of the pupils with an ill-digested mass of learning that cumbered the mind instead of fertilizing it.

Memory has its part to play in school and in life—in school because in life. To neglect its culture in early years is to forego power and resourcefulness in later years. Says Professor James, of Harvard:

In the practical as in the theoretic life, the man whose acquisitions stick is the man who is always achieving and advancing, whilst his neighbors, spending most of their time in relearning what they once knew but have forgotten, simply hold their own. A Charlemagne, a Luther, a Leibnitz, a Walter Scott, any example, in short, of your quarto or folio edition of mankind, must needs have amazing retentiveness of the purely physiological sort. Men without this retentiveness may excel in the *quality* of their work at this point or at that, but will never do such mighty sums of it, or be influential contemporaneously on such a scale.¹

The late Lord Coleridge, chief justice of England, gave his testimony, near the close of his life, in these words:

Speaking as an old lawyer, I may say that few things compare in usefulness with a retentive, accurate memory, and one of the best methods of strengthening it is the habit of learning by heart passages we admire from authors, both in prose and verse. Many of us live to grow old; if we do, our minds, if not ourselves, grow lonely. At such times the recollection of great thoughts, of lovely images, of musical words, comes to us with a comfort, with an innocent pleasure, which it is difficult to exaggerate.

It is not, however, to the duty of developing the memory, or to methods of developing the memory, that I would call attention, but to the value of literature memorized, and memorized in the schoolroom. That this intensive study of models of literature is neglected both in this country and in England it needs no argument to prove. Professor Max Müller, a few years before his death, adverted to this neglect as follows:

I have occasionally given expression to my regret that the old system of learning by heart at our public schools should have gone so completely out of fashion. Old men like myself know what a precious treasure for life the few lines are that remain indelibly engraved on our memory from our earliest school days. Whatever else we forget, they remain; and they remind us by their very sound of happy days, of happy faces, and of happy hearts.²

¹See *Psychology*, p. 293.

²See *Nineteenth Century*, November, 1899.

Those who occasionally advocate the memorizing of literature in the schools advocate it almost without exception for the elementary schools alone. In 1869 President Eliot said: "In language the first thing that a child should study with persistence and thoroughness is his mother-tongue; and this not through its formal grammar, but by reading aloud, by committing to memory choice bits." In the Report of the Committee of Ten (1894) it is recommended that "not later than the first term of the third school year"—that is, not later than the age of nine—"children should be required to write from dictation and from memory short and easy passages of prose and verse;" but in the committee's recommendations for the study of English in the high school the subject of memorizing is not mentioned. Nor is there any reference to the subject in the Report of the Committee of Fifteen (1895). In a recent work on *The Teaching of English in the Elementary and the Secondary School* (1903) by Professors Carpenter, Baker, and Scott, Professor Baker says that in the elementary schools "it has long been a practice to have children commit to memory bits of good literature. It is to be hoped that the practice will never die out."¹ But if in the elementary school, why not in the high school? The only clear statement that I have been able to find of the importance of memory work in the high school is in the general recommendations of the Conference on Entrance Requirements in English presented at the second annual convention of the Association of Colleges and Preparatory Schools of the Middle States and Maryland (1894). Their fourth recommendation is "that a considerable amount of English poetry be committed to memory in preparatory study."²

I would urge upon every high-school teacher in our association the importance of having his pupils commit to memory both prose and poetry. Every reason that can be adduced for "memory gems" in the primary and grammar-school grades can be urged with still greater force for keeping up the practice in the high-school grades. Why begin such a process of training and storing, if it be not worthy of continuation or capable of

¹ See p. 176.

² See *Proceedings*, p. 61.

development? Between the child, made forgetful of his surroundings by the spell of nursery rimes or *The Arabian Nights*, and the youth, waking to the larger life in *Silas Marner* or *The Idylls of the King*, there is no real break. Both are but different stages of the same growth, and the one is what makes possible the other. Besides, it is not until the high-school years are reached that the student is capable of memorizing understandingly the prose and poetry that will best minister strength and inspiration in after-life. To have the student discontinue this practice between the years of fourteen and eighteen, the normal high-school years, is to mistake the seed for the harvest, the scaffolding for the building.

I recently submitted to the present freshman class in the University of North Carolina the following questions:

1. Have you ever been required, in your preparatory English training, to memorize prose or verse? Answer in full.
2. What poems, if any, do you know by heart?
3. What prose selections, if any, do you know by heart?
4. In what school or schools were you required to do this work?

The returns showed that 38 per cent. of the class had never been required in their preparatory training to memorize either prose or verse. A few had supplemented the defect in their preparatory course by memorizing on their own initiative; but many of those who had been required to memorize in school had forgotten, before coming to college, what they had once learned or only partially learned. Of the entire class 35 per cent. reported themselves unable to repeat a single selection of prose or verse. These students come from the best high schools and academies in North Carolina and adjoining states. Such a condition of things is, to say the least, far from satisfactory.

In discussing briefly what seem to me the special advantages of memorizing select models of literature in both the elementary and the secondary schools, I deem it unnecessary to consider whether the pupil is to stop at the high school or to continue his studies at a college. The high school may not be the people's college, but, apart from its function as a link between the grammar school and the college proper, the high

school has a field of its own to cultivate and a service of its own to fulfil. In the quality of the English training to be given it makes no difference whether the student is to go from the high school into college or into active life. The entrance requirements in English adopted by nearly all the colleges in the United States are conceived on a liberal basis and are as fitting for the one as for the other.

The phase of my subject that has been generally overlooked is the practical aid that memorizing gives the student in writing and speaking his own language. I shall omit, therefore, all reference to the ethical influence or to the purely literary value of noble thoughts stored in the memory, and shall discuss the subject only as it relates to the use of the English language.

1. The first advantage to be conferred by memorizing prose or verse is in the broadening and enriching of the student's vocabulary. This position should need no elaboration; but the word "vocabulary" is used in senses so vague and varying as to be almost meaningless. What constitutes a writer's or a speaker's vocabulary? In the larger sense, a man's vocabulary includes all the words whose meanings he knows. This, at least, is his reading vocabulary. But this vocabulary is made up of two very different groups of words. The first group includes the words which he has never used either in writing or in speaking. He knows the meanings of these words and interprets them the moment they are read or heard; but he has never organized them into his own speech-use. The second group includes the words which he actually uses in speaking and writing. These words he has so assimilated as to make them the ready messengers of his own thoughts.

The first group is a vocabulary of knowledge; the second is a vocabulary of power. The one is static, the other dynamic. Our static vocabulary is always larger than our dynamic vocabulary. A pupil does well to increase his static vocabulary. He does vastly better to increase his dynamic vocabulary. Every time a word passes from his static vocabulary into his dynamic vocabulary, there is an access of power. Shakespeare's merit is not that he knew the meanings of sixteen thousand words, but

that sixteen thousand words companied with him to do his instant bidding. Webster's *Primary Dictionary* contains twenty thousand words. An examination of the range of words included in it convinces me that most college graduates have a reading knowledge of at least twenty thousand words, but they use only about a fourth of them. For the remaining three-fourths they use other words in more or less inaccurate senses, or resort to cumbrous periphrases. The problem is not so much of more words as of better words.¹

What steps are we taking to bring the student's unused words into daily use? Is not the emphasis constantly put upon rare and unfamiliar words? In the college-entrance requirements, for example, the pupil is told to look up the meanings of all words unknown to him. So he should, but some other discipline is needed. The emphasis, not only in his written exercises, but in his study of literature, should be put upon the growth of his dynamic vocabulary, rather than of his static vocabulary.

Lycidas is one of the poems assigned for special study in the high schools until the year 1908. The annotated editions call the student's attention to the following words: *crude* meaning *unripe*, *scatter* meaning *shatter*, *welter* meaning *toss about*, *coy* meaning *hesitating*, *battening* meaning *fattening*, *westering* meaning *moving westward*, *tempered* meaning *attuned*, *gadding* meaning *straggling*, *steep* meaning *mountain*, *rout* meaning *crowd*, *meditate* meaning *muse on*, *clear* meaning *noble*, *sacred* meaning *devoted*, *sanguine* meaning *bloody*, *amain* meaning *with power*, *enow* meaning *a considerable number*, *scrannel* meaning *thin*, *apace* meaning *rapidly*, *use* meaning *abide*, *rathe* meaning *early*, *freaked* meaning *spotted*, *anon* meaning *shortly*, *tricks* meaning *sets in order*, *laves* meaning *washes*, *unexpressive* meaning *inexpressible*, and *twitched* meaning *drew tightly around him*. How many of these words will the high-school student take into his own working vocabulary? How many could he be expected to take? Not one. But if he has committed to memory a section of *Lycidas*, the mere exertion of

¹"Let the accent of words be watched, by all means, but let their meaning be watched more closely still, and fewer will do the work. A few words, well chosen and well distinguished, will do work that a thousand cannot, 'when everyone is acting equivocally in the function of another.'"—RUSKIN, *Sesame and Lilies*.

memorizing, together with the drill of repetition, will tend to absorb these memorized words into his own speech-consciousness; they will almost necessarily be drawn into his own working vocabulary; and his daily speech will gain in power and adequacy. There will also be inculcated "the habit of looking intensely at words"—a habit indispensable to anyone who aspires to use language worthily.

2. Let us next consider memorized passages as a safeguard against bad grammar and as a preparation for appreciating the rules and distinctions of grammar. English grammar differs from all other subjects in that the influences of home and street are so often antagonistic to it. In the case of other subjects, the home environment may be favorable; it can hardly be actively unfavorable. However illiterate the pupil's associates may be, their influence cannot be hostile to geography, or to arithmetic, or to history, or to any foreign language; but in the case of English, the few hours spent in the schoolroom are expected to counteract the inherited practice of the pupil himself as well as the daily influence of his unlettered environment. It is evident that some more lasting discipline must reinforce the work of the teacher.

The mere reading of good literature outside the schoolroom produces in most cases hardly an appreciable effect upon the pupil's speech. There is not a teacher of English in our association who has not often heard his pupils, fresh from the pages of some juvenile masterpiece, describe a specially interesting scene or hair-breadth escape in language that would afford grounds for the charge of assault and battery against the author's English. Nor will a drill in the mere rules of grammar avail. The teacher is opposing what is temporary and occasional to what is inherited and ingrained; he is merely spraying the surface for what lies below the surface.

Take, for example, the combination "him and me," the forms used after a preposition or a transitive verb. The pupil knows this combination, but not in these forms. He has been accustomed to say "me and him" or, when on dress parade, "he and I." He has probably never once heard "him and me," for

the social circles in which these forms are correctly used are so few as to be negligible in our estimate. Suppose, however, that he has memorized even one selection in which "him and me" or "her and me," or "him and them," is properly used. His ear will have been partly trained; a norm will have been established; the rule of grammar will then attach to something already felt; and this particular expression will become a touchstone by which to test the correctness of similar expressions.

In many cases the rules of grammar relate to idioms that are wholly unfamiliar and meaningless to the pupil—idioms that he has never heard. The nominative absolute is a case in point. In such sentences as, "I being there at daybreak, the hunt began a few minutes later," or "He failing to meet us, the journey came to an end," the grammarians put the emphasis on the case of the pronoun, cautioning the pupil not to use the objective case. There is not much danger of his using the objective or any other case. The construction is probably new to him, or at least unassimilated. He would have said, "I was there, and the hunt began a few minutes later," and "He failed to meet us, and the journey came to an end." The nominative absolute is a thoroughly English construction, but, being practically unknown in conversation, has no place in the grammatical consciousness of most boys in the grammar school. It is usually not until the student starts the study of Latin or Greek, and gets broken in to the ablative absolute or genitive absolute, that he begins to have a feeling for the nominative absolute construction.

The same may be said of many uses of the subjunctive, of the present participle, of relative pronouns, and of dependent clauses in general. The pupil's range of construction is limited almost entirely to those employed in conversation; but the rules and processes of grammar are based on written English, and in written English the range of construction is coextensive with the resources of the language itself. Hence the need of committing to memory selections of prose and verse. Such selections supplement the structural limitations of spoken English and epitomize the results of years of mere reading. They not only safeguard the pupil, therefore, against incorrect usage, but impress upon

his mind in advance the concrete facts upon which the principles of grammar are based. Without this preparation the study of grammar must necessarily be uninteresting and unimproving.

3. As a last point let us notice the value of memorized passages in the study of rhetoric and the higher forms of constructive English. Such studies are usually almost barren of result; they teach the student to define and to identify figures of speech and forms of discourse, but rarely to assimilate and to use them. The memorizing of one characteristic paragraph from Addison, Goldsmith, Burke, Scott, Carlyle, George Eliot, and Macaulay—to mention only the prose writers assigned for the college-entrance requirements—will give the student a firmer grasp of the varieties of English style, and a greater facility in their use, than would the mere reading of all the prose now required.

With this secure basis for comparison and contrast the student will find the more advanced study of English style a constant challenge and a constant delight. Perception will become apperception. The distinctions made by the rhetoricians will correspond, not to abstractions, but to realities. Definitions will be seen to fit, not only the passages expressly cited, but that wider field of expression which the student has already made peculiarly his own. Formal rules will be looked at, not as impositions, but as embodiments. And on some memorable day, when the student shall pit the so-called rule against its victorious violation by a master, he will have passed from the aqueduct to the fountain, and have entered upon the heritage of a freeman's speech.

C. ALPHONSO SMITH.

UNIVERSITY OF NORTH CAROLINA,
Chapel Hill, N. C.

A PRACTICAL PRESENTATION OF SOME PROBLEMS CORRELATING MATHEMATICS AND PHYSICS.¹

EVERY student of social conditions and movements is wont to fix upon some phase of human activity which for each epoch may serve to epitomize the dominating idea of the epoch. But any idea which possesses sufficient human significance to occupy the center of the stage for an era must manifest its influence on human affairs in various ways. Each student must construe these manifestations under his own phase-angle. Out of this necessity arise both the weakness and the power of the individual. But if each would do his full duty to his fellows, he must communicate to them the benefit of his point of view. In this consists his power. In his failure to do this lies his weakness.

To the educationist the distinguishing mark of our age is, perhaps, the general and intense interest taken in popular education. A salient characteristic of educated American citizenship is its profound faith—amounting almost to credulity—in the notion that public education will accomplish almost any and every human good. The student of education would probably tell us that the dominant notes of current educational thought are mutual helpfulness and mutual serviceableness; in short, that the watchword of education is no longer "competition," but "co-operation."

Co-operation—individual, civic, and national—has already wrought among us wonders great enough to summon educational students to our shores to ascertain what it is in our school system that contributes to our national prosperity and prestige.

It is our faith in the efficacy of co-operation as a means of educational advance that calls us together in this conference. It is this same desire to co-operate that calls for a statement in words of some of the results of our attempts to correlate mathematics with physical science.

¹ Read before the Mathematics Section of the Central Association of Science and Mathematics Teachers, 1903.

To state one's impelling motives and ideals in mathematical pedagogy often calls for a terminology which is in danger of misleading a general gathering of teachers. It is difficult to speak of the laboratory plan of mathematics without conveying the impression that the speaker is wedded to some form of mechanical device for teaching mathematics. It is, however, only another instance of the difficulty of speaking briefly and concretely without becoming too concrete. The writer therefore wishes to disclaim, in the use of the phrase "laboratory plan of mathematics," the possession of any desire save that of securing brevity by the use of a phrase which has of late acquired at least a degree of explicitness among us.

Perhaps no word in our language has suffered so serious a perversion of meaning among mathematicians as has the word "method". During the last twenty-five years pedagogical sentiment has swung from knowledge of subject-matter to the acquisition of certain professional devices as the sole qualification for teaching. But these extreme views have in divers ways been reduced to a *reductio ad absurdum*.

There is no place where a study of method is more needed or would be more propitious of improvement than in the high school. Many mathematics teachers, clearly convinced of the dangers of allowing artificial devices for securing pedagogic ends to serve as makeshifts for a sound knowledge of subject-matter, and equally convinced of the need of a thoughtful adaptation of subject-matter to modern conditions and to immature pupils, find themselves halting between two extreme views, uncertain in which direction to throw their influence, lest they be trapped into the absurdities of the extremist, no matter which route they take. That this state of mind is explicable in the light of recent conditions, anyone conversant with these conditions will admit, though he would scarcely condone it. Still, however much we dislike the word "method," we do not fail in our respect for methodical work. But that the fear of being dragged too far even in the right direction should paralyze us into inaction is certainly unfortunate, if not puerile. For it is with mathematical movements as with moral—we cannot stand

still. If we do not advance, relatively to the movements of the age at least, we must recede. A prominent educator recently reminded us that most of us reach the high-water mark of professional service about three years after beginning practical teaching. Furthermore, mathematical movements, like vibrations of the pendulum, advance by vibrating back and forth through the position of stable equilibrium.

But in the midst of these oscillatory movements, which may easily be tolerated, if they meet the one fundamental condition of eventuating in progress, let us at all times keep in view the supreme end to be attained. It is trite to say that as mathematical teachers we are interested in the laboratory method, the correlation method, the individual method, the natural method, only as means to the accomplishment of something greater and of more fundamental significance than any, or all, of these mere methods taken together. Whatever interest attaches to these methods is, of course, altogether a secondary interest, borrowed from the interest in the primary central aim. While perhaps each earnest student of the problem of better teaching would state differently his conception of this central and dominating aim, it is nevertheless well that each attempt a statement of it, since each statement must be tinged with the individual point of view. By a sort of summation, or rather, of integration, of these individual conceptions we may in time hope to arrive at the correct general notion.

No conscientious believer in advance can allow himself to be debarred from giving his point of view by the dread of being trapped into foolish extremes through a misconstruction of his ideas. It is out of some such considerations as these that the writer is led to attempt a statement of what the problem really is which is consciously or unconsciously subsumed in all our efforts looking to the unification of mathematical subjects in the high school. To put the meaning simply, all the mathematical methodology of which we have of late been guilty—and, thanks to the live mathematical teachers, it has been considerable—has had the fundamental purpose of making the high-school boy, or girl, feel the true worth of mathematical study.

It is a great mistake to imagine that boys and girls turn away from mathematical studies because these studies are too difficult. When made to feel the real worth of performing it, the most difficult task becomes to them easy and palatable. Difficulty and danger do not debar youthful aspirants to a place on the high-school team. Stated differently, it is the seeming unprofitableness of the mathematical tasks imposed by current mathematics teaching that makes these subjects repellant to young men and women. As a teacher and lover of mathematics, I do not see why the boys and girls should be chided for neglecting the artificial tasks so rife among us, set by current high-school mathematical texts, and tolerated and dignified by too many secondary teachers. Young persons show the best of judgment in repudiating much of the work given them. To eschew the foreign substance demonstrates not only that they still possess sufficient mental springiness to reject matter having little or no affinity with their thought-processes, but also that relevant and assimilable subject-matter may still be taken up by their intellectual systems and used. As the writer sees the situation, the laboratory plan, the individual method, the correlation plan, are all of them merely practical means of getting the solution of the tremendously difficult problem, forced upon us by circumstances which the schoolroom formalists—the routinists—have at least aided in bringing into existence, viz., the problem of deartificializing the matter and method of mathematics. The frayed-out abstractions of mathematical scholasticism—for that is what the excessively abstract work seems to young students—are being pretty effectually shed by high-school boys and girls who are vitally in touch with the life that now is; and though some teachers are pretty thoroughly convinced of the inadequacy of such subject-matter, they are not yet quite certain what sort of subject-matter will secure the much-desired ends of mathematical education. Hence it comes about naturally that some who have set about in search of a better approach to abstract mathematics than the customary formal one find that high-school science is rich in useful mathematical matter, inasmuch as high-school students quite generally regard science work as being important enough to repay their

efforts to learn it. But what do we behold? Someone suggests the science work as a good basis for starting the mathematics. Then the inevitable critic says that the suggester is advocating the laboratory plan; and so in the mind of the critic a method bug-a-boo is born, christened, and thrust upon us, quite innocently, even unconsciously, on our part. Someone is then in grave danger of being blamed with having started a new method, and somehow the critic is nowhere in evidence when the fixing of guilt is being attempted. But, in the light of past pedagogic experience, we ought to be able to maintain our equanimity, even if new methods do arise in mathematics occasionally. Aye, I suggest that we ought even to try them out in the class-room before dissipating too much bad sentiment and good energy in quarreling with the so-called "new departure." New methods, new suggestions, are always most disturbing to the formalist, but let us remember that advance often occurs through them. Of course, most complaint is always heard where most breaking of images occurs; but this is usually where there exists the greatest need of disturbance.

This much by way of introduction may be pardoned on the score of a distinct desire on my part not to be thought of either as an innovator or as an apostle, or even as an advocate of any new method as such. The laboratory plan is not the concern of this paper. Still I would hasten to confess to the possession of a very zealous desire to see mathematics teaching everywhere, but particularly in the secondary school and in the early collegiate years, vitalized and brought into inspiring touch with the interests, motives, and convictions of young men and women. I confess to a feeling of dissatisfaction at seeing high-school and early college students turning away from every abstract mathematical subject not absolutely required and rushing, pell-mell, to almost anything as a welcome relief. I am very far from believing this tendency to be merely the manifestation of a general desire on the part of all college students to seek the so-called "snap" courses. I have never felt the solace that some college teachers seem to find in this view. The very fact that these young persons are in high school and college makes

the assumption safe that some, even many, of them are persons of serious purpose. Many are working their way through college, and such do not thus play at "fast and loose" with what they believe to be their best interests. They say they omit the optional mathematics courses because they see no earthly use for these subjects.

Again, the general ignorance of the average citizen of liberal education of mathematical truth is little short of appalling. Ask such a person, after he has unblushingly confessed himself to be a "mathematical ignoramus," how it happened that he didn't give more attention to mathematics while in college, and the answer is usually: "I didn't think the subject important then." Someone, the ignoramus himself chiefly perhaps, was to blame for this, but incidentally, I believe, the mathematical representatives he came in contact with are also, in a measure, culpable. Most of us would have difficulty in recalling many of our former mathematical instructors who took much pains to point out to us the great importance in almost any pursuit of a good knowledge of mathematics and to back it up with a little first-hand evidence. Most of us had to content ourselves with a "You'll see some day." As the writer passes in review the rather long line of glittering icebergs that have had to do with his academic career in mathematics, he can find two or three, out of some thirty, who could and did say something besides "mental discipline" to the favor of mathematical study. Doubtless others were more fortunate than the reader, but I dare say the vast majority that are in mathematical work for the love of it discovered their liking for it and their respect for it more or less accidentally and quite independently of their high-school, or college, instructors of mathematics. Let us not argue that, since we have become so worthy under this *laissez faire* and accidental treatment, it is therefore necessarily best for all students.

My point of view is that instructors of mathematics, not in any didactic way, but through subject-matter making a strong appeal to the understanding and judgment of young men and women, undertake to show the purpose, relation, and value of mathematical study to the all-around concerns and interests of

modern life. My thought is that this can be done most effectually in the high school by basing the mathematical work upon the pupil's former experience, upon his science, and upon whatever other quantitative questions appeal to him as of sufficient intrinsic importance to present a real problem to his mind.

Finally, I believe that physics makes a strong and natural demand for mathematics, but also that it is but *one* phase of the whole mathematical demand of the high school. It is for other persons and occasions to present the full-orbed mathematical demand of the high school. My task today is the humbler one of giving you a presentation of only some problems correlating mathematics and physics.

But, having confessed several things touching my views of the mathematical situation in the secondary school, I wish also to add a few items of my creed as pertaining to this same situation. I hold these truths to be self-evident:

1. That the results of current mathematics teaching are altogether satisfactory to no one.
2. That the reasons for this dissatisfaction are numerous and capable of varied diagnosis.
3. That mathematics teachers are partly to blame for poor results.
4. That mathematics teachers are not altogether to blame.
5. That science teachers, school superintendents, and machine-like administrative officers are aiders and abettors—even fosterers—of current shortcomings of mathematics teaching.
6. That the “cock-sure” state of mind and the general self-satisfaction with one's own output toward which all mathematics teachers gravitate must bear a good deal of the odium of popular censure.
7. That it requires more sympathy, patience, industry, humility, knowledge, and tact to be a successful secondary mathematics teacher than to be a successful minister of the gospel.
8. That divine providence is also involved in the controversy for not making mathematics pupils always to remember accurately everything they were ever taught, and for making mathematics teachers so imperfect.

9. That mathematics teaching might even be made to furnish results satisfactory to physics teachers and still be very far from what it should be.

10. That the aim of mathematics teaching should be, not to exemplify or illustrate any method of teaching, but to underlay the necessary amount of abstract work with such a basis of useful material for thought that mathematical truth and method may appeal to the student as a very powerful aid to the right understanding of this real world.

11. That blind and disjointed mathematical study—that is, work lacking point and purpose to the student—at the very best can have but very low educational value.

12. That, of all secondary subjects, mathematics most indispensably demands unity and clear purpose.

13. That the most serious criticism against current mathematics teaching is that it appeals to the pupil as mere empty abstraction and barren ingenuity.

I now pass to a few practical examples, such as I have actually used with high-school classes with what seemed to me a sufficient measure of success to justify doing much more of it myself and commending to those concerned in the practical problem of unifying the mathematics and science in the secondary curriculum.

I. A method of handling experimental data in a mathematical class may be exemplified here by the study of friction. The data and results of such a study are given in the table for the friction of pine on pine:

Experiment with Carriage on Edge	Combined Load, L	Observed Force, F_o	Compared Friction, F_c	Error, $e=c_1$	Compared E	Error, $e=c_2$
1	500 g.	160 g.	162.5	- 2.5	141.5	+18.5
2	700	210	227.5	-17.5	214.9	- 4.9
3	900	280	292.5	-12.5	288.3	- 8.3
4	1,100	370	357.5	+13.5	361.7	+ 8.3
5	1,300	420	422.5	- 2.5	435.1	+15.1
6	1,500	500	487.5	+12.5	509.0	- 9.0
7	1,700	600	552.5	+47.5	581.9	+18.1
8	1,900	650	617.5	+32.5	655.3	- 5.3
9	2,100	730	682.5	+47.5	728.7	+ 1.3
10	2,300	800	747.5	+52.5	802.1	- 2.1
11	2,500	875	812.5	+62.5	875.5	+ 0.5

Casting the eye down columns 2 and 3, it is readily seen that F increases when L increases. The first suggestion would then be that L and F increase proportionally. Show the pupil that this is equivalent to saying that the ratio $F:L$ is the same throughout; *i. e.*, that $\frac{F}{L} = k$, a constant.

Now find k thus: In the second experiment divide $F (=210)$ by $L (=700)$, and get $k_2 = 0.30$. Also find k_{10} similarly from the tenth experiment $800 \div 2,300 = 0.35$. Suppose the true value, k , to be $(k_2 + k_{10}) \div 2 = 0.325$, or that the law of friction is

$$F \propto 0.325 L. \quad (1)$$

Now, the values of L given by experiment were as they are given in column 2. Substitute these values successively in law (1) and obtain the numbers, F_c , of column 4. If law (1) had been correct, and both observations and computations had been made correctly and accurately, the corresponding F_o 's and the F_c 's would have been equal. We form the errors ($o-c$), in the sense $F_o - F_c$, noting carefully the signs, and enter them in column 5. We assume also that our law should be such as to make the errors as small as possible.

Casting the eye down the column of ($o-c$)'s, we readily see that the errors increase as L increases. Both the algebraic signs and the numeral values show this. What we should like to do with law (1), then, is so to alter it as to make F larger when L is large, and, at the same time, not to change the values of F too much for small values of L . This will be done by taking the law in the form—

$$F = xL + y.$$

Now let us find x and y . To secure a little greater accuracy, we take for L and F the mean of their values in experiments 2 and 3, and substitute in (2), getting $254 = 800x + y$. Similarly, 9 and 10 give $765 = 2,200x + y$. Solving these equations for x and y , we find $x = 0.367$ and $y = -42$, giving the law—

$$F_o = 0.367 L - 42. \quad (2)$$

Substituting in law (2) for L the numbers of column 2, we find successively those of column 6 for F' . The errors, $o-c_2$,

are again formed, entered in column 7, and compared with those of column 5. The representation is found to be very much better and for values of L lying between 500 g. and 2,500 g. may be regarded as satisfactory. The corrected law (2) is then

$$F = 0.367 L - 42. \quad (2)$$

There is little of the algebraic technique, from the beginning of algebra to the solution of simultaneous linear equations, that is not called for in this work, though, at every step, it appeals to the student as subsidiary—*incidental*, if you please, but not *accidental*—to an appreciably valuable main purpose. Nor is the arithmetic ignored. The student is also learning where "to put the point," for he is handling decimals throughout.

II. The pine block, when placed on its side, and similarly loaded and dragged along the pine surface, gave the values of the following table, and (1) the approximate, (2 and 3), two corrected, and (4) the mean law are stated in order just below the table:

Exp.	L	F_o	F_c	$F_o - F_c$	F_s	$F_o - F_s$	F_3	$F_o - F_3$	F_4	$F_o - F_4$
1.....	500 g.	130 g.	150 g.	- 20 g.	105 g.	+ 25 g.	127 g.	+ 3 g.	116 g.	+ 14 g.
2.....	900	250	270	- 20	240	+ 10	255	- 5	252	- 2
3.....	1,300	375	390	- 15	393	- 18	385	- 3	388	- 13
4.....	1,800	540	540	0	573	- 33	543	- 3	558	- 18
5.....	2,100	675	630	+ 45	681	- 6	639	+ 36	660	+ 15
6.....	3,500	825	750	+ 75	825	0	767	+ 58	850	+ 5

$F = 0.30 L$ (approximate law from experiments 1 and 6). (1)

$F = 0.36 L - 75$ (first corrected law from experiments 2 and 6). (2)

$F = 0.32 L - 33$ (second corrected law from experiments 1 and 4). (3)

$F = 0.34 L - 54$ (third corrected law, mean of (2) and (3)). (4)

Law (1) gave the values of column F_c ; law (2) those of column F_s ; law (3) those of column F_3 ; and law (4) those of column F_4 . A study of the error columns, showing the evidence as to the character of the successive representations, should be made. It is also worth while to give the student the method of judging as to the nature of the representation by a comparison of the sum of the squares of the errors in each case.

Graphical work might profitably come in here in either of two ways: (1) the student might represent geometrically the final law; (2) he might have plotted the observations, and, with the aid of a taut string, might have drawn the mean line and derived

the law independently from the picture, and then have compared the law, graphically derived, with that derived algebraically and arithmetically as above. But I would not advise using the graph of observations, or of equations, otherwise than as a means to a better understanding of some law, or truth, which is really illumined by it. I doubt the wisdom of using the graph for its own sake much before the early college years. I am convinced of the wisdom of using it *as a means* to "lighting up" difficult matters even before the high school.

The law of the pendulum may be used in the algebra class to introduce the study of proportion and variation—two subjects which should be taught together.

III. (1) A pendulum, 75 cm long, was made to vibrate, first on a short arc, then on a long arc, the number of vibrations in 30 seconds in the two cases being 35 and 35. This convinced the class there was no need of paying attention to the length of the arc of vibration.

(2) Then an experiment showed that the weight of the bob made no special difference in the time of the vibration.

(3) Six pendulums, of lengths given in the second column of the table below, were allowed to vibrate for 30 seconds, each member of the class counting the vibrations. The average of the counts gave the several numbers of column 3. The time of vibrations were then computed as in column 4, as also the square roots of the lengths as given in column 5.

Different members of the class then computed the ratios of assigned pairs of the times and of the corresponding lengths, and compared the two ratios. The two ratios were found so nearly equal that it was readily seen that, with absolutely correct counts and measures, the ratios would be exactly equal. The law of proportionality $t_1 : t_2 = \sqrt{l_1} : \sqrt{l_2}$ was then formulated and studied algebraically.

Exp.	l	n	t	\sqrt{l}	k
1.....	19.1 cm	68.5	0.43	4.37	0.1
2.....	24.8	60.0	0.50	4.99	0.1
3.....	37.1	49.4	0.61	6.93	0.1
4.....	74.6	35.0	0.86	8.94	0.1
5.....	103.8	29.4	1.02	10.19	0.1
6.....	224.0	20.8	1.44	14.96	0.1

The class was then asked to find to two decimals and shorten to one the ratio of each t to its \sqrt{l} . In each case this was found to be 0.1, and it was then seen that the following law could be written:

$$\frac{t}{\sqrt{l}} = k \text{ or } t = k\sqrt{l}$$

where k is a constant, nearly equal to 0.1. The class was then told that the correct $k = \frac{\pi}{\sqrt{g}}$, where $g = 9.81$ meters, and k was found from this relation also, for the practice it gave in reducing such equations.

The law $t = \pi\sqrt{\frac{l}{g}}$ was then formulated, and the class was asked to compute the length of the seconds pendulum. If time had permitted, the value of g for various places would have been given, and the lengths of the seconds pendulum as well as the time of vibration of the meter, half-meter, one-yard, one-foot pendulums for each case would have been computed for the sake of the drill.

IV. A light steel spring was loaded with weights, W , as shown in column 1 and the lengths, L , of the spring under the several loads were as given in column 2. The stretches, S , corresponding to the loads, are given in column 3.

W	L	S	k
0 g.....	72.3 mm	....	....
25.....	76.1	3.8 mm	6.58
50.....	79.8	7.5	6.67
75.....	83.6	11.3	6.64
100.....	87.4	15.1	6.62

Shortened to one decimal place, k is 6.6 and may be regarded as constant for the spring, so that the law may be formulated thus: $W = kS$, where $k = 6.6$, for this spring. The law may, and should, also be derived in the form

$$\frac{W_1}{W_2} = \frac{S_1}{S_2}$$

V. The lengths, l , and heights, h , of an inclined plane on which

a car carrying loads, L , was supported by the forces, F , are tabulated here:

l	h	L	F
100 cm	6.18 cm	638 g	38 g
100	6.18	1,038	63
100	12.5	638	78
100	12.5	1,038	123
100	25.5	638	153
100	25.5	1,038	255

The ratios $h : l$ and $F : L$ were computed, compared, and the law formulated into both

$$F : L = h : l$$

and

$$F = kL, k \text{ being } \frac{h}{l}.$$

Here the k is constant for any loading, but variable for different loadings, and this extension of the idea *fixed constant* to the notion of *arbitrary constant* is important and is greatly facilitated by this experiment.

An experiment on Boyle's Law with a flexible mercurial tube gave the following data for teaching the law $p_1 : p_2 = v_2 : v_1$ (*inverse variation*), and also suggested the form $pv = \text{a constant}$, for algebraic study:

p	v	$p \times v$
46.0 cm	20.8	1,566
83.8	18.9	1,584
98.5	16.1	1,586

Several other laws were given and treated experimentally, but the foregoing will suffice to give an idea of the character of the work.

GEORGE W. MYERS.

THE UNIVERSITY OF CHICAGO
College of Education.

WHY DO STUDENTS LEAVE COLLEGE BEFORE GRADUATION?¹

Our southern colleges and universities are numerically smaller than similar institutions in the east, north and west. This numerical disparity is due to a variety of causes, which we need not here discuss, for they are obvious enough to all members of this association. There is another disparity, however, the reason for which is not so manifest. Statistics reveal the fact that a much larger percentage of students graduate in the northern than in the southern higher institutions of learning. If these are facts, it would appear that we of the South can neither induce students to enter our colleges and universities in large numbers, nor graduate a relatively large number of them after they have entered. The question for discussion, therefore, would seem to be both timely and pertinent. We shall make no attempt, however, to institute further comparisons between northern and southern institutions, but shall confine our attention to conditions that prevail in the South and Southwest.

To make our conference fruitful, it is evident that many of the reasons why students leave college before graduation must be eliminated at once. For example, this disposition must be made of all such sporadic causes as destruction of college property by fire, the prevalence of epidemics, sickness of individual students, death in their families at home, failure in business of parent, guardian, or friends, and favorable business openings which must be accepted promptly. All of these causes are, in a sense, abnormal.

Further, there are other causes which may be called normal for any given institution, but inapplicable to others. Thus, in a denominational college, apathy or hostility toward the institution on the part of the denomination that fosters it may seriously interfere with the number of students at any given time. Official

¹ Read at the annual meeting of the Association of Colleges and Preparatory Schools of the Southern States.

obtrusion of politics into the affairs of a state university may not only cripple its influence, but reduce its patronage. Institutions under private control are often injured by their very isolation, being the prey alike of rival state and denominational colleges with which they come into active competition. Further, not being subjected to a search-light criticism from without, they are the more liable to become the victims of corrupt forces from within. Again, any one of the three classes of institution above mentioned may be organized under the elective or curriculum system, or under some modification of these two. Now, the more rigid the curriculum, the stronger the bonds that bind the members of a class to one another; hence the greater likelihood of retaining till graduation those that enter the freshman class. But it should also be remembered that in institutions where many elective courses are offered a considerable number of students enter college with the avowed intention of taking only a few special courses leading up to an ultimate professional career. They never expect to graduate, and could scarcely, therefore, be said to leave before graduation.

In this association we have state, denominational, and private institutions, with varying degrees of rigidity in curricula and of laxity in election. Little can be gained, then, by the discussion of causes applicable only to one class of institutions. We shall confine ourselves, therefore, to causes of general educational interest. It is apparent that, if a student leaves college before graduation, his departure must be due either to himself, to the college, or to some outside cause. These three are often inter-related, as in the case of a general financial depression, but it may be profitable to consider them separately.

Let us consider the question first from the student's point of view. Omitting the exceptional case already mentioned, we find that students leave college mainly because of poverty, idleness, discontent, or failure to come up to the required standard. In our southern colleges a considerable percentage includes those whose means are inadequate. Some are plucky, leave off a year or so, and then return to resume their interrupted work; but the majority go away to stay. If successful in business, they do not

care to give up an independent livelihood and return to the routine of college life.

But perhaps an even larger number leave because they have too much money to spend, and become, therefore, so idle and dissipated that they give up their college course in disgust or are recalled home by their disgusted parents. These college sports set the pace for the social side of college life, and in the effort to keep up with them students of more moderate means are tempted to run into debt. This the parents ultimately discover; their sons are called home in disgrace, and take perhaps years to liquidate their obligations. It requires grit and pluck for a student to withstand the temptations to spend money that assail him at every turn in his college career. The college activities have become more and more numerous within the last decade or so, and all clamor for cash. For example, at the Washington and Lee University, Lexington, Virginia, these are the causes to which the liberal-hearted student full of college spirit may be expected to contribute his funds: a literary society, and possibly a law society, the Young Men's Christian Association, a boat club, football, baseball, tennis, track athletics, golf, the cotillon club, the state clubs, the final ball, one real fraternity, one or more of the bogus ribbon fraternities, and each of the three college periodicals. Further, if a student is "sporty," he will dress well, play billiards, smoke, and indulge surreptitiously in forbidden extravagances.

The sensible and well-balanced youth selects out of this long list only those that he has time and money to enjoy, and that will redound most to the cultivation of body, mind, and soul. But if he is too rigidly exclusive in his selection, he subjects himself to censorious remarks which few have the backbone to ignore. It is to the honor of the student body, however, that the man who rises superior to such criticisms and sincerely follows his own convictions wins respect and confidence ultimately. But some yield, plunge into debt, become sour and discontented, and leave college. If they go to another college, they encounter similar temptations, generally with similar results. We may say, in passing, that the non-graduates of other institutions are usually

the least desirable of all students. The same causes that led them to leave one institution will operate to drive them from another. These collegiate peripatetics come and go annually, making about as little impression on college life as Burns's snowflake did on the river.

Another potent reason why students leave college is failure in their studies. There are three chronic causes for such failure—inability, idleness, and inadequate preparation for college. If the student is well prepared for college and industrious, the first cause will operate in so few cases that it may be ignored. The number of well-prepared students intellectually unable to pass an ordinary A.B. course of study is surprisingly small. This is certainly the observation of the writer extending over two decades at three collegiate institutions.

There are varying forms of idleness, from the busily idle student who plunges enthusiastically into as many forms of college activity as possible, except class-room activity, to the mere loungeur and loafer who leads at college an aimless and do-less existence. Another type is those that spend most of their time reading magazines, books, and papers. These and the first class of idlers get much good out of college life, but the benefit is often so intangible that when their reports go home peppered with deficient grades their parents find that they are needed in the barnyard or behind the counter.

The third and most fruitful cause of failure—inadequate preparation for college—this association is actively engaged in removing; and so successful have been its efforts that we do not believe any institution that has ever tried entrance requirements would be willing to revert to the former freedom of entrance.

Besides the causes mentioned, students leave college because of the lethargic condition of the student activities, such as the literary societies, the Young Men's Christian Association, or athletics in its various phases. All college authorities know that the success of these student enterprises is due largely to a few active, capable, tactful leaders among the students themselves. The absence of such leaders is always severely felt. Without them college life becomes dull, and an atmosphere of vague discontent

is created. Hence some students leave and seek a livelier environment. It is difficult to estimate the force of this cause, as it is a fad with many students to vilify the stupidity and slowness of their college. Often the loudest malcontents are the first to put in their appearance in the fall.

Thus far we have been considering our subject entirely from the student's point of view. Let us see now how far the college itself is responsible for the loss of students. If an institution is poorly equipped in faculty, library, apparatus, or buildings, thoughtful students will discover this after they have entered, stay a year or less, and then go elsewhere. Of course, this cause operates more to keep students away from an institution altogether than to drive them off after they have once matriculated. Further, equipment is relative. No southern institution would pretend to be as well equipped as Harvard, Cornell, or Chicago. In any given southern territory, though, where institutions come into active competition with each other, the better class of students will be likely both to enter the one that is best equipped and to leave the one that is poorly equipped. Then, too, the reputation for sound scholarship, honest, faithful work, and high standards, ethical, social, and intellectual, will not only attract but retain students. This we must believe or shut up shop. Every good book added to the library or magazine to the reading room, every fine piece of apparatus set up in the scientific department, every new study introduced, furnishes its quantum of strength to the institution, and to the tie that binds the real student to the college of his choice. Each professor may be a co-operant force to the same end. He may have a large and magnetic personality, and move students in the mass; or if his influence is analytic rather than synthetic, he will move them as individuals. A shrewd graduate of our institution once said: "Boys don't come to college because you have a good faculty. Before they come they know little about the faculty and care less." Even granting that this is true, the faculty ought to be instrumental individually and as a corporate body, in keeping them at college when they come.

Each professor will exert his influence in his own peculiar

way, and the most effective influence is a professor's personality. The system of advisers in vogue in a number of colleges aids materially in the exercise of this influence. The students are apportioned among the professors, and each professor exercises thus a special supervision over a definite number of students. At the close of the session he is expected to hand in to the president the status and future plans of each student in his group. This enables the president to find out with approximate correctness the attitude of each student toward the college. In this way many difficulties are removed, and the way made clear for the student's return the forthcoming session.

Another fruitful cause of discontent among students is the injudicious exercise of discipline on the part of the college authorities. We believe that in the main young men are influenced powerfully by high ideals of justice. If these are judiciously applied, students yield readily to discipline; if they are violated, they speedily become disgusted and go elsewhere. We who are in authority forget perhaps too often that he that ruleth his spirit is better than he that taketh a city. Self-control and transparent justice are the levers that move young men most powerfully.

We have attempted thus far to discuss our question from the point of view of the student and of the college itself. Let us glance briefly, in conclusion, at the causes that operate from without to induce the student to leave college before graduation. Confining ourselves, as before, to causes of general educational interest, we find that the two principal ones are local or general financial depression, and lack of interest on the part of the public in the cause of higher education.

It is speciously argued by some that in times of financial depression parents send their sons to college because there is nothing for them to do at home. Facts and figures, however, do not bear out this assertion in the South. A succession of short crops in a section still largely agricultural has always meant a shortage in the attendance at the colleges. The higher education is at such times regarded as a luxury rather than a necessity.

But this cause will operate with decreasing force as the interest in higher education increases. Never in the whole history

of the South has the average youth been so eager to avail himself of the advantages of the college course. It is true that, owing to the enormous advance of the South in material prosperity, the increase of students has been more apparent in the technological and industrial schools than in the classical; but in the latter also there has been a distinct advance. Within the last decade many of our best-known institutions have doubled their attendance; and unless all signs fail, the end is not yet.

W. S. CURRELL.

WASHINGTON AND LEE UNIVERSITY,
Lexington, Va.

THE STUDENTS OF THE NIGHT SCHOOLS.

DURING the last decade there has been a tendency among our educators to excite public interest in the various institutions of the country by laying particular stress on the growth of the schools themselves, rather than on the great increase in the number of those students who work under difficulties. There can be no better reason for the existence of a school than the fact that it attracts and helps those who help themselves; and the chief glory of such a school should be, not that it has greatly increased its size, but that it is presenting opportunities to those who are willing to accept them.

The enlarging of the night schools of New York city is but an index of the increasing body of ambitious men and women. To become convinced of this, stand on the street corner near one of our large free, or nominally free, night schools (the first session usually begins about 7:30 o'clock), and watch the pupils pass by. They come by the car loads; the houses in the vicinity seem to supply unlimited numbers; from every street and alley they pour forth—singly, in groups of two's and three's, and in crowds. They are talking of amperes and of engines, of angles and of chemicals, of Latin verbs and of Greek roots. From all conditions of life they come. Most of them appear very respectable; indeed, they are respectable, for one may be sure that when a poor man is careful of his dress, there is something to him besides clothes. And they appear courageous; indeed they are courageous, for when a man takes the world as he finds it and sets about to improve upon his heritage, he has the kind of courage that is most needed. Every head is held high—a simple thing, yet the sign of something great; for a large body of young men and women do invariably hold their heads high, often when weary. For them to step straight ahead, after a long day's work; for them to brace their shoulders back, sometimes heavy-burdened; for them to meet the world "fair and square;" for them to "fight it out"—it is a thrilling sight and stirs one's manhood.

By far the greater number of those who attend the night schools do not live at home. It is not that they have no home. Thousands, indeed, are all alone in the world; but there are other thousands who have a door always open to them, and a father and mother somewhere "up-state," or among the New England hills, who send to their boy or girl loving helpful messages; and in conversing with these sons and daughters one will find what encouragement the weekly letter from home is to them. Many have come to the larger fields of the city through choice, and find, when they have been here a while, that to overcome competition they must better qualify themselves for their respective vocations; or they have left home through necessity, and on arriving in the city are obliged to do whatever presents itself first, because they have never become competent in any chosen pursuit. To such as these the night school is a priceless boon and one from which all may enrich themselves.

Hundreds of young men in our department stores and retail houses are not clerks; they are students in the night schools; all else is supplementary. Their present occupation is a stepping-stone, maybe to success, at least to something higher. The story of the office boy rising above his employer was so popular a few years ago that its very popularity, like that of *Hiawatha*, almost proved its undoing. Perhaps it is not desirable for the office boy of today to take full charge of the office and business of his employer under two weeks' time. Yet this old story of "success" takes on a new aspect when we watch these clerks and office boys going to night school. Then we feel that, if they do have success, it will not be a matter of luck. They will deserve success. Then we can understand the literal meaning of Longfellow's stanzas:

The heights by great men reached and kept
Were not attained by sudden flight;
But they, while their companions slept,
Were toiling upwards in the night.

Hundreds of our foremost men have proved these lines, and the hundreds who pass to our night schools are working out the problem.

Not all the pupils in the night schools are young. There is the man who is nearing middle age, and who realizes that he has not made the most of himself. Perhaps he has not had opportunities that have come to others; perhaps he has neglected his opportunities. However it has been, he wakes up some morning and sees himself, almost a failure. He has a family to support, and he cannot leave his trade to attend school. Work by day, and study by night is the only course open to him, if he would rise. You can see him as he steps from the car. He is evidently a mechanic, fairly respectable, and carries a text-book under his arm—on architecture, perhaps, or engineering. It is no "snap" for him to attend night school. He has to pay the price for having lived so long without an education. It costs him something every hour of his life.

If a man has ambition, he can readily figure the difference in cost between ignorance and knowledge, and he will find that the balance is decidedly in favor of knowledge. Ignorance is a costly thing. Someone has said that it is the greatest of all luxuries, because it is the least of necessities. He who indulges in this luxury must forego many of the necessities of real livelihood, and the sooner he gives it up, the sooner he will be able to make something of himself. This mechanic will tell you that he feels somewhat out of place in school; that he ought to have been through that part of his education years ago. Now he has to work on the plans "Better late than never" and "The sooner the better."

In the free evening high schools of New York city, in which there is an enrolment of over 14,500, 60 per cent. of the pupils are girls; but in the higher-grade evening classes of such organizations as the Cooper Union and the Y. M. C. A., where more practical work is taken up, the men are in the great majority. This would seem to indicate—and the reports show it to be true—that the young women study more to cultivate the æsthetic and the young men the practical. Music and art continue to be the favorite studies of the former, and the sciences and professions those of the latter. There are more girls than boys preparing for college in the evening high schools, and when I asked a young

lady the reason for this, she said: "The poor fellows are in too much of a hurry." And that was the truth in a nutshell.

Yet each has a right to his own ideal, it may be in one line of work, it may be in another. Whatever it is, we have been educated to believe that, if it is noble, one should be encouraged to live up to it. The truth of the matter is, with few exceptions, if one's talents do not prove incentives to personal effort, they are worth very little, and, least of all, worth cultivating.

The majority of men are born with no great aptitude; and even when one thinks he has a talent, that in itself is no proof of the fact. Many have found to their grief that it is easy to be deceived in themselves; but in one thing there can be no mistake: when a man sets about to develop a talent, real or supposed, he proves, whatever the result, that he himself is worth something. If these night students do not attain one of their ultimate aims, they will have a broader outlook and a more utilitarian point of view from the knowledge they have gained, and from the struggle they have made in gaining it.

When the public is made to realize that the night school presents to a particular class of people, not an educational advantage alone, but also an opportunity for thousands to discover themselves, develop their characters, and realize their ideals, then public interest will be still more awakened in this, one of our most praiseworthy institutions.

J. H. KING.

BROOKLYN, N. Y.

EDITORIAL NOTES.

GEORGE HERBERT LOCKE.

IN a witty and suggestive article in the *Monthly Review*, M. R. F. Cholmeley tells of the difficulties that beset the pathway of those who would make secondary schools more efficient. The old division of the world of education into the two great classes of *teacher* and *taught* he discards for that of *examiner* and *examined*. Examination, in as far as it relates to a school, means a thorough inspection of that school, but upon the method by which this may be best accomplished there has been no agreement. Royal Commissions have investigated and the most energetic of the educationists have preached in regard to it, but without any real result. The reason for this failure is ascribed to the fact, first, that the British public is so thoroughly satisfied with the great public schools that it would take a whole bench of judges to shake its faith; and, secondly, because the great public schools are so thoroughly satisfied with themselves that it would take an archangel to shake theirs. Neither judges nor archangels are available for the work of inspection, and hence the schools in which are educated the boys of promise are allowed to work without suggestion as to educational or material betterment. Mr. Cholmeley says that parents seem to be satisfied if they get rid of parental responsibilities for nine months in the year, during which they fondly hope that their sons are mixing with boys of a slightly superior social position to their own; school-masters make a living which on the whole varies, as it should, with their business capacity and other estimable qualities; and the boys enjoy themselves to such a degree that the mere pleasantness of school life is enough to account for the fact that they generally stay at school some two years longer than is good for them. The very idea of inspection carries with it imperfection, fault-finding, and other disagreeable things; and so long as the public schools feel that inspection would be an impertinence, and the parents that it would be a waste of time and money, inspection is not within the range of practical politics. After this graphic description of the situation, Mr. Cholmeley outlines a plan by which those who are curious to know something of the working of the system may be at least partially satisfied. He suggests examination papers which, if treated thoughtfully, may be of infinite service to parents, while the mere effort of contemplating the questions asked might set going new trains of thought in those who attempted to answer them—a merit sometimes claimed for examinations in general by true believers. Some

A NEW METHOD FOR
THE INSPECTION
OF SECONDARY
SCHOOLS

of the questions are so peculiarly English that we have omitted them, and quote enough in each division to show the general attitude of the writer. Under the heading "General Questions" (for head masters only) such questions as these are suggested:

State briefly your qualifications for the post which you now hold, in order of importance, giving dates where necessary.

Comment on the phrases: *In loco parentis*; "formation of character;" "discipline must be maintained;" "intellectual interest;" *mens sana in corpore sano*; "moral tone."

Give a brief sketch of the development of the "Higher Athleticism."

What are advantages and disadvantages to a school of having on its governing body (a) a city company; (b) bishops; (c) local magnates; (d) university professors; (e) old pupils; (f) educational experts?

What do you know of "infantile psychology," and why?

Write a short review of "Stalky & Co."

"No great nation was ever saved by a good man because good men will not go the necessary lengths" (Walpole).

Discuss the application of this saying to the duty of a headmaster, and illustrate your answer from your own experience or that of other headmasters of your acquaintance.

Under the heading "Relations with Boys" occur the following:

How many boys in your school do you know by sight?

How much general lecturing on morals in the course of a term is enough to destroy the sense of duty to a whole school?

Distinguish the educational advantages of Rugby football, billiards, gymnastics, and golf.

"Boys are always reasonable, masters sometimes, parents never" (attributed to a late Archbishop of Canterbury). Discuss this statement with special reference to the first clause.

Distinguish carefully between reasonableness and ability to reason.

How would you deal with the following cases: (1) A B is reported to you as idle and self-indulgent. Both his parents, who are well known to you, are the same. (2) A boy of fifteen complains to you that his life is made a burden to him by the horrid speech and conduct of his companions. Beginning to investigate the matter, you find it unanimously asserted by his dormitory that he refuses to wash.

Under "Relations with Parents" there are concrete cases cited, of which the following are samples:

How would you deal with the following cases: A member of your school asks leave off school to attend a famous cricket match in which his brother is playing; on your refusal he plays truant and brings a note from his mother to say that he was too ill to go to school.

A country clergyman writes to you that, as his son is going into the diplomatic service, he will be glad to have him placed in a form where he will learn colloquial German, Spanish, American, and Japanese; at the same time he expresses a profound belief in the value of a sound training in classics and mathematics, and a hope that his boy's pursuit of these studies will not be interrupted.

Write an essay on *one* of the following subjects; (1) "The Limits of the Personal Interview;" (2) "The Classification of Correspondence;" (3) "Some Applications of the Term 'Cantankerous.'"

Under "Relations with Staff" these are suggested:

In promoting to positions of high responsibility, how would you estimate the following qualifications in an assistant master: (1) old age; (2) a sense of humor; (3) widowed mother; (4) efficiency as a teacher?

How many probationer students have you in your school, and how much would you give them to go away?

Have your colleagues ever offered to present you with a testimonial; and, if so, what did you infer from the proposal?

Give a summary of the principal signs of incompetence in an assistant-master, distinguishing those which a wise system of training might be expected to remove.

The part of the examination which relates to the assistant-masters will likely be the most interesting to our readers as being more directly applicable to the situation in an American schoolroom:

How much of a growing boy's company do you think that a grown man can stand in the course of a week, and *vice versa*?

Discuss the precise value of personal dignity in relations (a) with your chief; (b) with your colleagues; (c) with your pupils.

In punishing boys for deliberate offenses, what do you consider a fair division of discomfort between yourself and the culprit? Illustrate by examples.

Distinguish the fraternal, the avuncular, and the paternal attitude of games, and give reasons for preferring any one of them.

Discuss the limits of home-work for boys and masters. What course do you recommend an assistant-master to adopt who finds himself expected to look over all the work that he sets.

In what order of merit would you place the following qualifications as likely to be useful to a schoolmaster: geniality, imagination, attention to business, eloquence, sincerity, a good digestion?

How often in the course of a term is it safe to (a) allude to your own school-days; (a) tell a humorous story in school; (c) threaten to cane a boy without meaning to do it; (b) tell any given boy that he ought to be ashamed of himself?

Prove the following: if any five boys concoct a plan for amusing themselves, the odds that it is at somebody else's expense are as the product to the sum of their ages.

BOOK REVIEWS.

The Moral System of Shakespeare. By RICHARD G. MOULTON. New York: The Macmillan Co. \$1.50.

WHATEVER Dr. Moulton writes is worthy of attention, but especially interesting and stimulating is his writing on dramatic subjects. His latest book, entitled *The Moral System of Shakespeare*, bears striking evidence of years of study in the classical and romantic drama. This new volume may not only serve as "a text-book of Shakespeare for students of literary clubs or scholastic institutions," but equally guide the general reader in the work of the great dramatist.

At first, we are not attracted by the title of the volume, but are set right by the first sentence of the Introduction, which explains that "the title is not intended to suggest that the man Shakespeare had formed in his mind a certain system of morals which he proceeded to put into his plays. . . . 'Shakespeare' is only used as a convenient name for the whole body of thirty-six dramas usually attributed to William Shakespeare. . . . The contents of these thirty-six plays make a world of their own, a world of personages, of incidents, of story. It is surely possible to survey this imaginary world from the same standpoint from which the moralist surveys the world of reality; the result of such a survey, put together with some degree of methodical order, will give us the moral system of the Shakespearean drama."

The volume is divided into three books. Book I, with the caption "Root Ideas of Shakespeare's Moral System," deals first with certain of the history plays and shows how the heroism of character founded on the breadth of human nature is "the heroism of the full soul, not consciously ambitious even of mortal greatness, yet adequate to every demand." Then are traced *wrong* and *retribution* through the three parts of *Henry VI* and *Richard III*. The third chapter, entitled "Innocence and Pathos," attempts to show that retribution is not an invariable principle, but that the "moral system of Shakespeare gives full recognition to accident as well as retribution, as in *Romeo and Juliet*." Then *wrong* may find its restoration, as may be illustrated by *Winter's Tale* and *Cymbeline*.

Book II, treating of "Shakespeare's World in its Moral Complexity," was to us the most interesting section of the volume. In dealing with three of the Roman plays, Dr. Moulton begins his discussion by a comparison of the use of certain terms applied to ancient and modern life. Thus *Coriolanus* shows the ideal of the state; *Julius Caesar* shows in a later stage of development "the pure ideal of the state and the growing force of individuality;" and finally the conflict between these ideals is centered in the personality of Antonio himself in the play bearing his name. Two of the best chapters of the volume treat briefly the development of comedy and tragedy from the classical drama, and the difference between comedy as life in equilibrium and tragedy as equilibrium overthrown, are the converse of the other.

Book III passes to those forces of human life which are reflected in the drama—personal, individual will, restraints of will from within and from without. Thus we are introduced to *Intrigue*, "an expression of personal will in a very pronounced

form;" to *Irony*, "the conflict of one with other individual wills." The forces that tend to limit will, heredity and environment, are discussed in the chapter "The Momentum of Character and the Sway of Circumstance," then come the forces of vast movements of history to which character yields or rises superior; finally the forces of the supernatural as influencing life in Shakespearean drama.

The Appendix gives schemes of plot for each of the Shakespearean plays.

We have briefly outlined this new and comprehensive study of the life represented in Shakespeare's plays. Though we are every week confronted with a new work on Shakespeare, and still the master lives despite all these impediments, yet we are inclined to believe that Dr. Moulton's book has a place. Well planned, well written, definitely illustrated with analyses of the plays, it reaches conclusions drawn from a study of the plays themselves. We may wish for a different phraseology occasionally, but we must confess that the work leads only to a clearer understanding of the life and the structure of the plays, and makes the reader eager to know them better. In this volume of Dr. Moulton's at least one reader has found pleasure and profit, and can sincerely recommend it to all who wish to know better human nature as reflected in the greatest dramas of our literature.

WILL D. HOWE.

BUTLER COLLEGE,
Indianapolis.

TWO RECENT HISTORIES OF AMERICAN LITERATURE.

A History of American Literature. By W. P. TRENT. New York: D. Appleton & Co. Pp. 598.

A Reader's History of American Literature. By THOMAS W. HIGGINSON AND H. W. BOYNTON. Boston: Houghton, Mifflin & Co. Pp. 350.

THE year just passed produced two noteworthy additions to the histories of American literature—one by Professor William P. Trent, of Columbia; the other by Thomas Wentworth Higginson, assisted by Henry W. Boynton. Professor Trent's book is one of the series of "Literatures of the World," edited by Edmund Gosse, each volume dealing with one of the great national literatures, and aiming to give "a uniform impression of its development, history, and character, and of its relations to previous and contemporary work." Mr. Higginson's work is based upon a series of lectures before the Lowell Institute, its name designing its primary purpose. *A Reader's History of American Literature.* Each book contains a valuable bibliography; that by Professor Trent is the more complete, as becomes the more pretentious volume. The bibliography compiled by Mr. Boynton is rather for the general reader or the less mature student.

After a careful comparison with the other, more ambitious histories of American literature, one feels that Professor Trent's book is the most scholarly work of its kind yet produced. The book is thoroughly sane in tone, careful in judgment, and free from the colossal provincialism that marks another history covering the same field. The author's words impress us that, while he has weighed well the best that has been written by literary historians and critics, he has written after a fresh, careful rereading of the authors discussed. The book is marked, too, by a gratifying air of reserve power. One gains, perhaps, Professor Trent's own aims and purposes from his criticism of Lowell, "who," he says, "was rather a talker about books, pouring from his

wonderfully filled mind what seemed for the moment most apropos and entertaining, than an orderly critic, carefully and systematically discussing his subject." Careful and systematic Professor Trent has certainly been. One disagrees with the author in bringing the history to a close with the literature produced before 1865. To omit one generation in three that have produced literature in this country certainly truncates the work, especially when a large portion of the book is given to authors whom, as Professor Trent acknowledges, "it is impossible to treat otherwise than tentatively and to a certain extent in an impressionistic fashion." In spite of Professor Trent's attractive manner of presentation, too, the layman, at least, though cheered by an occasional oasis, will find some portions of the history pretty dry reading. The discussions of Longfellow, Poe, and Whitman are perhaps the happiest portions of the book; and these are just the authors requiring the greatest sanity to treat justly and sanely.

Mr. Higginson's book aims, confessedly, not to present a literary history of America, "but simply to give a connected account of the pure literature produced by Americans—not to be in any sense a minute literary cyclopædia of the work, but rather the attempt to select, as time selects, the best or representative names of each period in its course." The appendices are intended, evidently, to adapt the book for use as a class-room text. To the writer it seems that the book is ill adapted for any such purpose. An interesting account of American literature, at times a fascinating one, told in an admirable manner, with the added interest of some very modestly told, yet invaluable, personal reminiscences; but nevertheless one would wish rather to use the volume for occasional readings to a class, or to place as a convenient temptation for the student himself, than to employ it as a regular text. One cannot praise too highly the portrait of Emerson, used as a frontispiece, nor help wishing that, even were it necessary to forego some of the numerous and valuable facsimiles of letters inserted, the publishers who have such a wealth of illustrative material at their disposal should not have made greater use of it. While devoting little space to the minor characters, Mr. Higginson has given us a number of admirable little sketches of some of them, as, for example, his few lines on N. P. Willis. Naturally the treatment of the New England group is the most valuable portion of the book; and of these pages those devoted to Lowell are perhaps the best.

H. G. PAUL.

THE UNIVERSITY OF ILLINOIS,
Champaign, Ill.

NOTES.

PROGRAM OF THE CLASSICAL CONFERENCE OF THE MICHIGAN SCHOOLMASTERS' CLUB, YPSILANTI, MARCH 31—APRIL 1, 1904.

1. "How Is the Classical Course to Be Made More Attractive to High-School Students?" Miss Clara Allison, Hastings. The discussion will be led by Professor J. C. Kirtland, Jr., Phillips Exeter Academy; Miss Belle Donaldson, Detroit Central High School; Principal Charles S. Jacobs, Ypsilanti; Miss Mary F. Camp, Hastings.
2. "Latin Begun with Short Studies." Professor James G. Sutphen, Hope College, Michigan.
3. "Latin and Greek in the High Schools of Wisconsin." Professor Edward W. Clark, Ripon College, Wisconsin.
4. "The Fourth Book of the *Æneid*." Principal F. B. Pearson, East High School, Columbus, O.
5. "Sight Reading in Our Secondary Schools." Principal Daniel W. Lofthman, East High School, Cleveland, O.
6. (a) "The Vision and the Visions of Lucretius;" (b) "The Latin Case-ending *-ae*—Why Did It Not Become *i*?" Professor John W. Beach, Mount Morris, Ill.
7. "The Provincial Concilia." Professor Walter D. Hadzits, Wittenberg College, Springfield, O.
8. "Excavations at Delphi" (illustrated). Professor Martin L. D'Ooge, University of Michigan.
9. "Who Invented Latin Shorthand?" Professor Henry A. Sanders, University of Michigan.
10. "The Latest Excavations in the Roman Forum" (illustrated). Professor Samuel Ball Platner, Western Reserve University, Cleveland, O.
11. "The Metamorphosis as a Literary Form." Miss Mary R. Whitman, Beaver College, Pennsylvania.
12. "Dramatic Representations in Juvenal's Time." Miss Mary L. Miner, East High School, Detroit.
13. "Some Notes on the Application of the Doctrine of Evolution to Paleography." Professor Frank F. Abbott, University of Chicago.
14. "Some Greek Grave Inscriptions." Professor John W. Mecklin, Washington and Jefferson College, Pennsylvania.
15. "Meter or Rhythm, Which?" Professor H. W. Magoun, University of South Dakota.
16. "Parallels to the Sixth Book of the *Æneid*." Mr. Archibald W. Smalley, Lewis Institute, Chicago.

17. "The Origin and Significance of the Three Styles in Ancient Rhetoric." Professor G. L. Hendrickson, University of Chicago.
18. "Notes on Plutarchean Ethics." Professor George D. Hadzits, University of Cincinnati.
19. "The Value of Comparative Linguistics to the Classical Student." Dr. Clarence L. Meader, University of Michigan.

On Friday evening, April 1, Professor Thomas D. Seymour, of Yale University, will give an illustrated lecture on "Archæological Explorations and Excavations in Greek Lands."

VON HOLST.

A MAN, though a specialist!

The number of spades used in the cultivation of the soil of France just before the revolution did not exhaust his interest in life. He brought from his historical studies an illumination which shed its rays on all the social and political struggles of his own time. He did not peer furtively and impotently at the world over a bulwark of bibliographies and card catalogues. Czar Alexander of Russia felt his influence. So did Boss Tweed of New York. So did the grand duke of Baden. So did Mr. Debs of the American Railway Union. So did Governor Altgeld. So did President Cleveland.

It was a pamphlet on Russian misgovernment that drove him, sick and famished, to America. In America the fight against Tweed filled his feeble body with fire. On his return to Europe his tireless excavations in state archives did not prevent him from becoming a member of the upper house of the Baden Landtag, and ultimately a member of the privy council. When, after refusing offers from Johns Hopkins University and from Clark University, he was haled to the University of Chicago, his voice rose in keen, penetrating tones against the lawlessness that was Debs and the complaisance that was Altgeld. In 1898 his mistaken but unmistakable patriotism led him to attack President Cleveland's Venezuelan policy. He was an original anti-expansionist, and stood steadfast amid the thinning ranks. And, meanwhile, he was pursuing those researches which made his constitutional history of this country one of the greatest intellectual achievements of his generation. Could a life be filled much fuller? Could there be a more effective rebuke to the specialists who can't see through French pre-revolutionary spades to the life around them?

In Europe he had seen expansion and tyranny combined. He refused to believe that they could be separated. He had developed an infatuation for the particular kind of freedom which the Germany of his youth needed. No other kind of freedom seemed to him possible.

In his prejudices, however, as in his convictions, he was always a "peer among his peers." Impoverished, sharing a New York tenement room with three laborers, he had a prescriptive right to the one rickety chair which the

LIBRARY
OF THE
UNIVERSITY of ILLINOIS



